247306

SDMS DocID 247306

FIELD INVESTIGATIONS OF UNCONTROLLED HAZARDOUS WASTE SITES

FIT PROJECT

TASK REPORT TO THE ENVIRONMENTAL PROTECTION AGENCY CONTRACT NO. 68-01-6056

FIELD INVESTIGATIONS OF UNCONTROLLED HAZARDOUS WASTE SITES

FIT PROJECT

TDD # F1-8005-01F

December 5, 1980

TASK REPORT TO THE ENVIRONMENTAL PROTECTION AGENCY CONTRACT NO. 68-01-6056

SITE INSPECTION REPORT
of
OLIN CHEMICALS GROUP PLANT

Eames Street
Wilmington, Massachusetts

Submitted to:
John Hackler, Chief
Office of Uncontrolled Waste Sites
U.S. EPA, Region I

Submitted by:
David Cook, Project Leader
Ecology and Environment, Inc. (E & E)
FIT Team, Region I

ecology and environment, inc.

International Specialists in the Environmental Sciences

SITE INSPECTION REPORT

FOR

OLIN CHEMICAL GROUP
WILMINGTON PLANT

TDD #:	F1-8005-01F
Firm Name:	Olin Chemicals Group
Address:	Eames Street Wilmington, Massachusetts
Telephone:	203-356-3156
Owner:	Corporation
Principal Contact at Site:	Mr. David Vaughn (Hartford Office)

1. Purpose of Inspection:

To gather information and samples necessary to determine the potential for possible RCRA and/or 311/104 Clean Water Act actions against Olin Chemical Group.

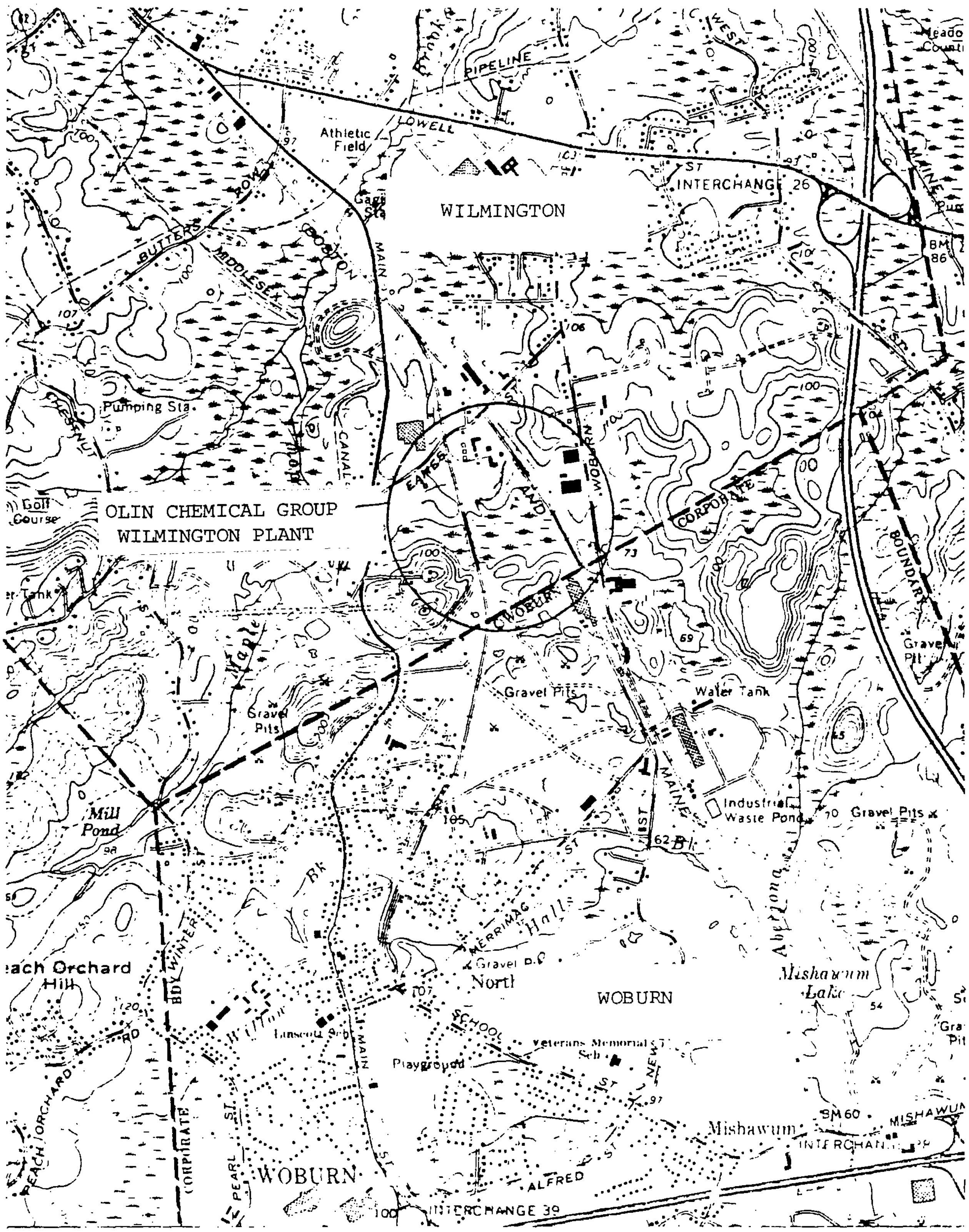
2. Objective:

To conduct an on-site investigation of the Wilmington Plant site in order to locate evidence of contamination, identify possible contaminants and collect appropriate samples for screening and analysis.

3. Background:

3.1 Description:

The Olin Chemicals Group Wilmington Plant occupies a 53-acre site south of Eames Street in Wilmington, Massachusetts. The site is bounded on the east by the Boston and Maine railroad tracks, on the south by the Woburn-Wilmington town line, on the west by a Boston and Maine railroad spur, and on the north by Eames Street (See Figures 1 and 2). The property was purchased by Olin Chemicals Group in September, 1980 from the Stepan Chemical Company which had occupied the site since 1971. Chemical plant operations on this site began in 1953 under the ownership of National Polychemicals, Inc. which merged with Stepan Chemical Company in 1971. The northern one-half of the site is occupied by the production facilities, and the southern one-half is wooded. A drainage ditch parallel to the Boston and Maine tracks borders the eastern project site boundary and carries water from north to south. This drainage ditch continues adjacent to the tracks until its confluence with Hall's Brook about 0.9 miles south of the site. Nearly all surface water on the site is routed to a single channel which flows into the drainage ditch, as shown in Figure 2.



From USGS Quadrangle Map - Wilmington Quadrangle.

Scale: 1" = 2000'

Figure 1 - Location Map of Olin Chemicals Group Wilmington Plant.

3. Background:

3.1 Description -continued

At the time when the aerial photograph presented in Figure 3 was taken (April 24, 1971), three acid pits existed to the south of the processing facilities. These pits have been replaced by rectangular settling basins as shown in Figure 4 (photographed on April 29, 1977). An extensive area of distressed vegetation is present in the east-central portion of the property. Also on the property are eleven large storage tanks noted in Figure 4. there are twelve wells on the property as noted in Figure 2.

3.2 Primary Site Activity:

Several chemicals have been synthesized on-site from a variety of ingredients. The processes used and the final products are as follows (quantities based on 1973 production figures):

Opex Process - Dinitropentamethylenetetramine (DNPT), a slightly water soluble solid used as a blowing agent in the production of expanded rubber compounds, 1.2 million pounds per year.

Kempore Process - Azodicarbonamide (Kempore), also a slightly water soluble solid used as a rubber blowing agent, 1.6 to 1.8 million pounds per year.

Wytox Process - Wytox, a liquid phosphite rubber stabilizer, one million pounds per year.

Wytox ADP-X Process - Dioctyldiphenylamine (DODPA), a dark colored resinous solid, 600,000 pounds per year.

O.B.S.H. Process - Oxybisbenzenesulfonylhydrazide (OBSH), a rubber blowing agent, 300,000 pounds per year.

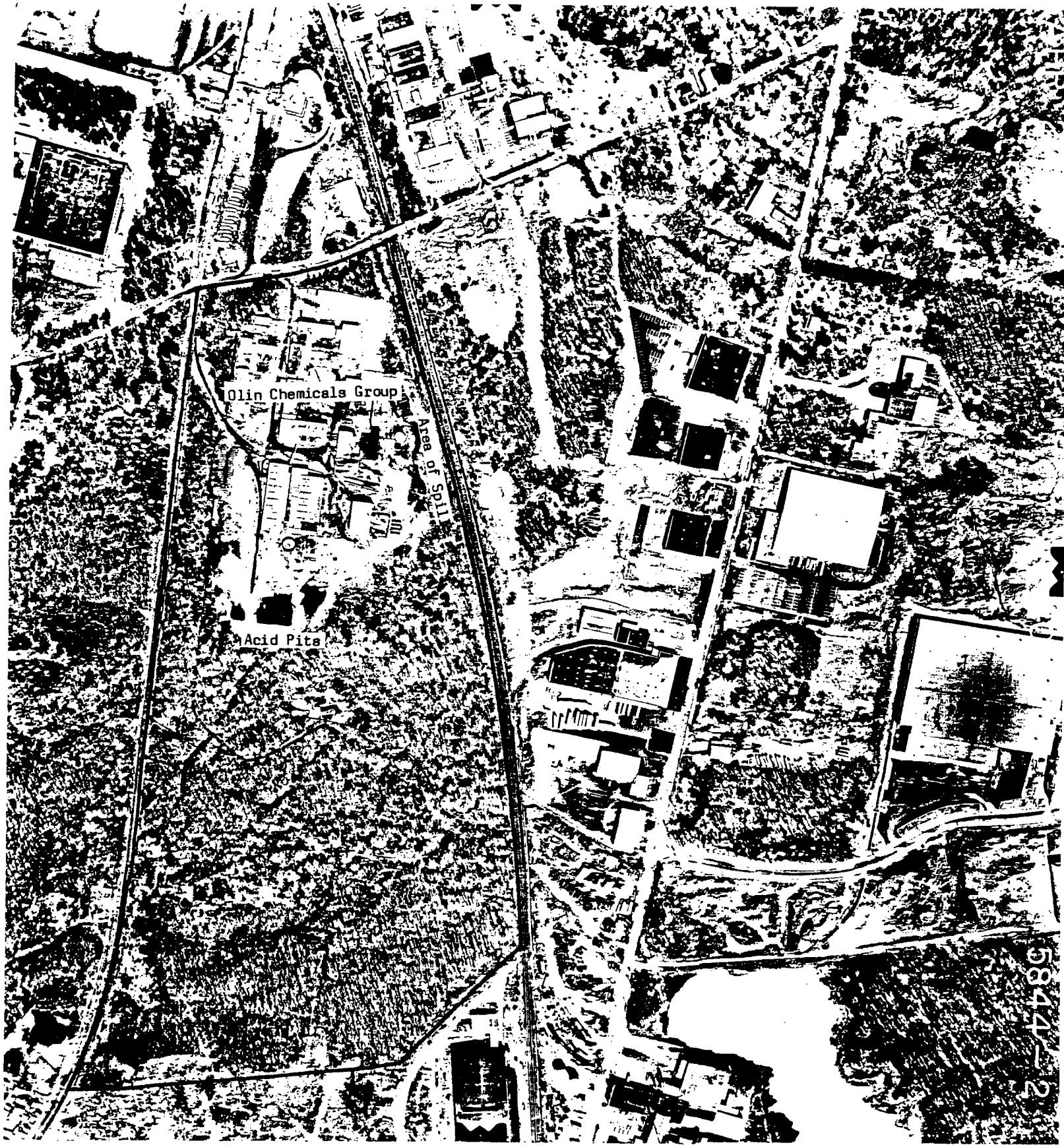


Figure 3 - April 24, 1971
Aerial Photograph Showing
the Location of the Former
Acid Pits.

3. Background:

3.2 Primary Site Activity - continued

Raw materials and waste products for the preceding processes are listed in Table 1. Only those waste products discharged into the yard or floor drainage system are listed. The drainage system is shown in Figure 5.

In addition to the above processes, numerous coatings for rubber products were produced on site. The following chemicals were used to produce the coatings:

Bentone
Santocel
Ufamite MM 67
Toluene
Butylacetate
Acrylic Resins
Maleic Anhydride
Glycerine
Fatty Amines
Silicone
Monoethanolamine
Mineral Oil

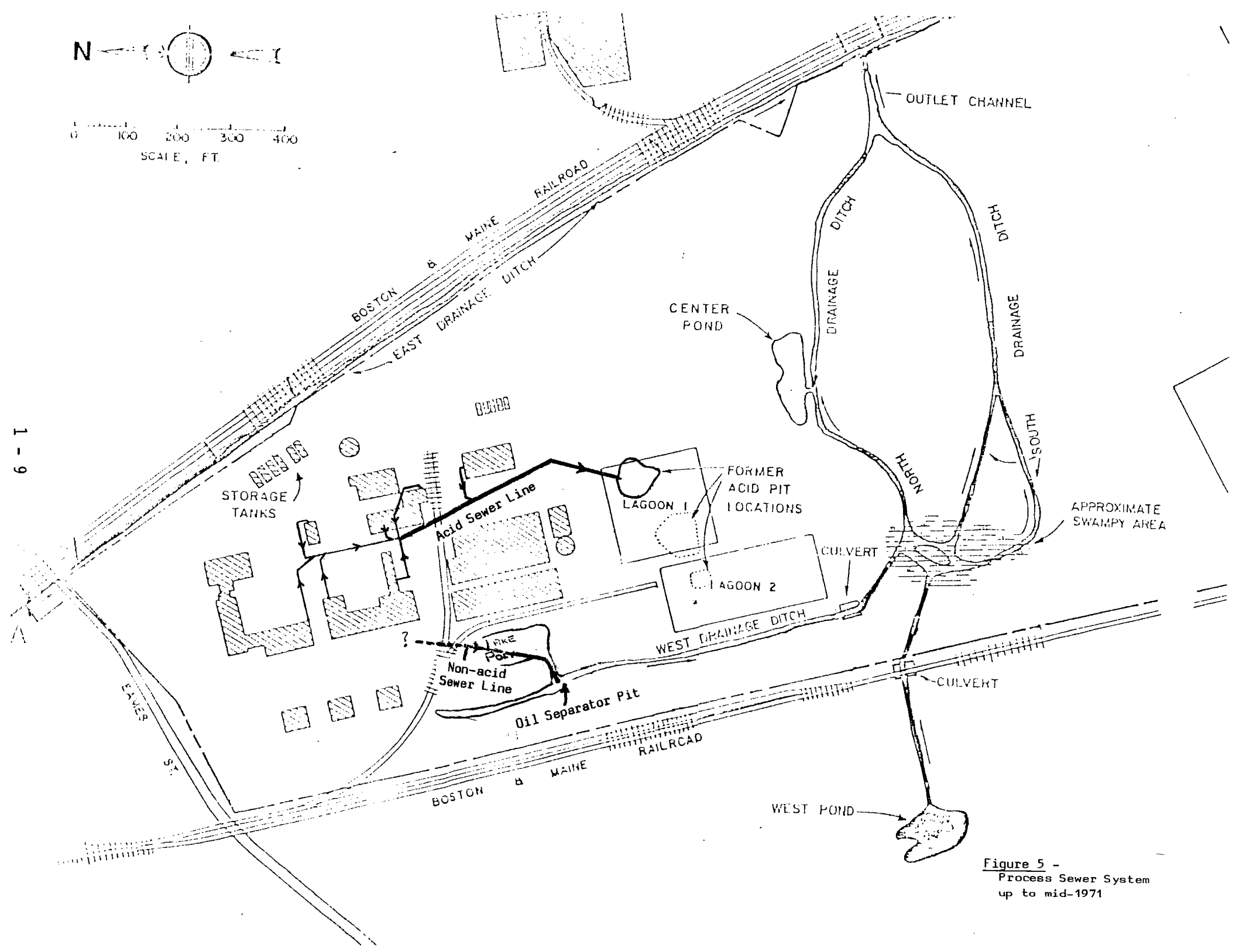


Figure 5 -
Process Sewer System
up to mid-1971

3. Background:

3.2 Primary Site Activity - continued

TABLE 1 - Raw Materials and Waste Products Associated With Chemical Processes Used by National Polychemicals, Inc. and Stepan Chemical Company between 1953 and 1978.

Process	Raw Materials	Waste Products
Opex	anhydrous ammonia formaldehyde sodium nitrite hydrochloric acid	sodium chloride formaldehyde sodium nitrite process oil
Kempore	liquid chlorine urea sodium hydroxide sulfuric acid hydrazine	sodium sulfate sodium chloride ammonium sulfate urea sulfuric acid
Wytox	phosphorous trichloride paraformaldehyde nonyl phenol	None sewered
Wytox ADP-X	diphenylamine diisobutylene aluminum chloride	diisobutylene aluminum hydroxide sodium chloride
O.B.S.H.	diphenyloxide chlorosulfonic acid	sulfuric acid

3. Background:

3.2 Primary Site Activity - continued

According to MDC records, the following materials were being stored on-site as of June 30, 1980:

MATERIAL BEING STORED:	Annual Thruput (gals.)	Type of Storage Container (tank, drum, etc.)	Size of Container (gals.)
1. Formaldehyde	172,500	Tank	13,300
2. Nonyl phenol	281,600	Tank	10,000
3. Dinonyl phenol	30,500	Tank	6,700
4. Ethyl hexoic acid	18,400	Tank	5,000
5. Dioctylphthlate	54,200	Tank	15,000
6. Process Oil	11,800	Tank	4,250
7. TNPP (Wytox 312)	50,000	Tank	10,000

Chemicals used or manufactured at this site are transported in 55-gallon drums by railcar.

3.3 Secondary site activity:

Not applicable

3. Background:

3.4 Hazards Identified or Alleged:

Potential sources of contamination as a result of on-site activities past or present are the following:

1. Leaking of materials from storage tanks.

2. Leaching of materials from acid pits.

3. Leaching of materials from burial sites.

4. Exfiltration from sewers.

A close examination of the chemicals which have been used on-site indicates that only a small number may have contributed or are contributing to an environmental hazard. Toluene and dioctylphthalate are included in the Federal Register list of priority pollutants. It is highly likely that toluene would have volatilized soon after a spill. Dioctylphthalate is very persistent and has been associated with pneumonia-like symptoms. Several other chemicals used on site including hydrazine, nonylphenol, dinonylphenol, and ethyl hexoic acid may cause undesirable symptoms. The extensive vegetative stress noted on-site is probably the result of high sodium chloride and sulfuric acid concentrations leaching from the former acid pits.

Prior to 1971, all waste materials were disposed of on-site either into a series of three acid pits or directly into a series of channels on the property. Eventually, all material either leached or drained into the ditch paralleling the Boston and Maine railroad tracks and proceeded ultimately to the Aberjona River. In 1971, disposal of wastes was changed to the system presently in use. Sulfate bearing wastes are mixed with a calcium hydroxide slurry to form a calcium sulfate sludge which is disposed of in two polyvinyl chloride (PVC)-lined lagoons. An analysis of this sludge is as follows (analyzed by National Polychemicals, Inc., September 1970):

3. Background:

3.4 Hazards Identified or Alleged - continued

Water	27,500 lbs.
Gypsum	26,800 lbs.
$CaCO_3$	650 lbs.
Calcium Oxbisbenzene Sulfonate	Trace
Na_2SO_4	Trace
Al $(OH)_3$	Trace
NaCl	Trace
$CaCl_2$	Trace
Formaldehyde	Trace
$NaNO_2$	Trace
NH_4Cl	Trace
TOTAL	54,950 lbs. = 27.5 Tons/Day

A study performed in 1979 by Geotechnical Engineers, Inc. of Winchester, Massachusetts, indicated that several holes exist in the PVC liner (See Figures 6 to 8). It was also discovered that sludge has been dumped in an emergency lagoon when the two existing lagoons filled to capacity (See Figure 4). This emergency lagoon had no liner and was formed by dredging soil to form a roughly rectangular area. Solids from the lagoons are dredged periodically and landfilled on the southwest corner of the property. The landfill site was approved by the State Department of Environmental Quality Engineering (DEQE). The analysis of the sludge indicates that no environmental hazards would result from leaching of the lagooned or landfilled materials into the ground.

Non-sulfate bearing wastes generated on-site are presently discharged into an underground sewer line which connects to a Town of Wilmington owned sewer. This line connects to a Metropolitan District Commission (MDC) sewer line. Complaints regarding high chloride, sulfate and ammonia levels in the sewer effluent have been made on several occasions.

Figure 6 - Leak Along the Seam
of the Polyvinyl Chloride Liner
in the Sulfate Sludge Lagoon.

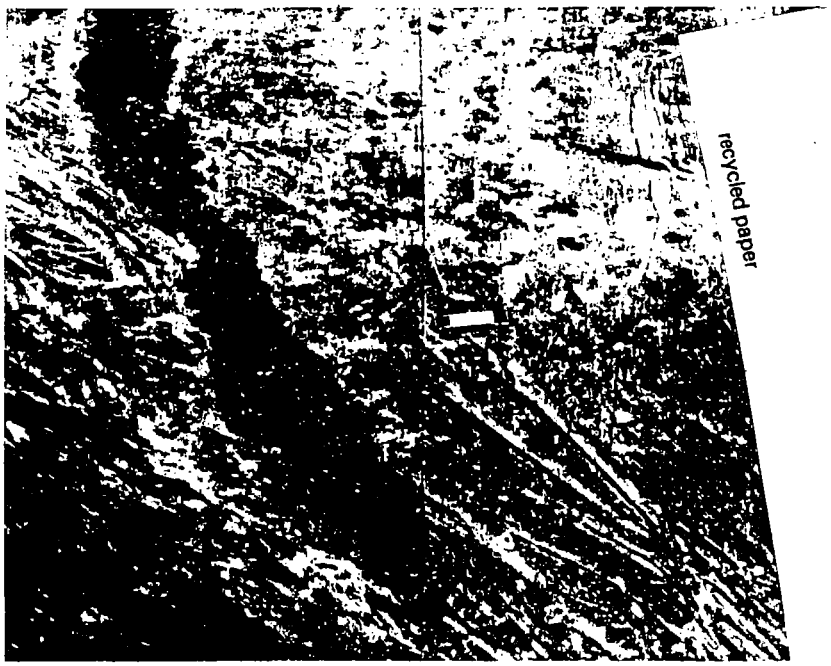


Figure 7 - Enlargement
from Figure 6.

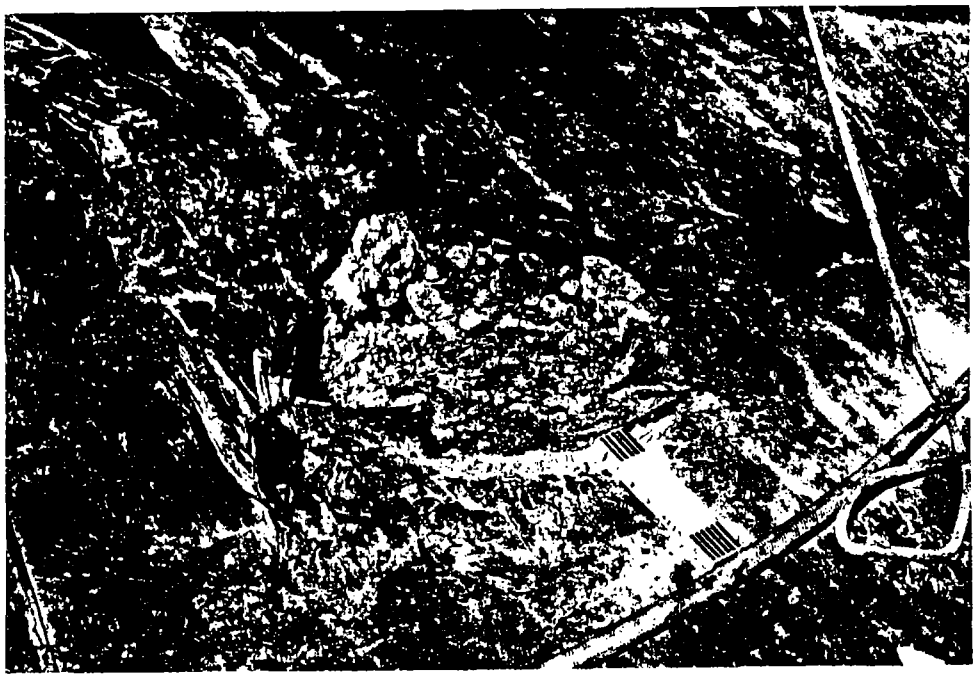


Figure 8 - Hole in the Polyvinyl Chloride Liner Associated with the Sulfate Sludge Lagoon.

3. Background:

3.4 Hazards Identified or Alleged - continued

An unofficial report from a former Stepan employee indicates that phosphorus trichloride was often dumped directly into the ground and that residues were buried next to the wetlands near the drainage channel. Sediment and ground water samples were taken in an attempt to confirm or deny the existence of an environmental hazard resulting from such alleged activities.

A 1977 aerial photograph shows two areas where drums were stored on-site (See Figure 4). Leaks in these drums may have resulted in ground water contamination. The 1971 photo (Figure 3) also reveals a spill generating from the group of six large storage tanks on the east side of the property. Since 1973, "black ooze" has been noted seeping into the drainage ditch paralleling the railroad tracks east of the site (Figure 9). A sample was taken by the E & E, FIT team on October 2, 1980, (See memo to John Hackler from David Cook dated October 6, 1980). A conversation between D. Cook (E & E) and D. Vaughn (Olin) revealed that dioctylphthalate, dimethylamine, dioctylamine and other related compounds are present in the "black ooze" as well as in Well GW-2 (See Figure 2). This was determined by an analysis performed by Olin. Mr. Vaughn was very hesitant to have Well GW-2 sampled. He stated that he knew the well was contaminated and Olin was prepared to perform remedial actions of an undisclosed nature to rectify the situation.

The drainage ditch mentioned above has been the object of sampling and analysis on several occasions. On January 23, 1980, five samples were collected by the EPA and subsequently analyzed for purgeable organics. The results indicated the following:

1. Moderate to high levels of 1,1 - dichloroethane, 1,1,1 - trichloroethane, trichloroethylene, toluene and xylene are present upstream of Stepan/Olin.

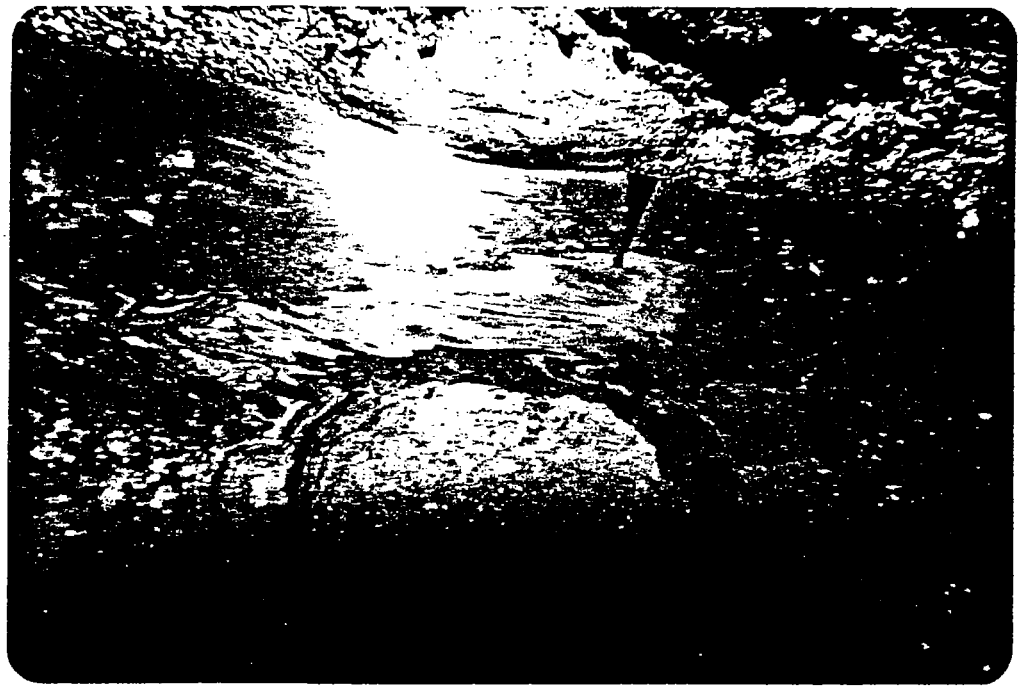


Figure 9 - Sheen resulting from "black ooze" seeping into the Drainage Ditch.

3. Background:

3.4 Hazards Identified or Alleged - continued

2. Moderate to high levels of 1,1,2 - dichloroethylene and 1,1,2 - trichloroethane in addition to the five chemicals listed under (1) are present downstream of Stepan/Olin.

3. Therefore, some chlorinated hydrocarbons may be leaching from Stepan/Olin into the drainage ditch.

4. Analyses of the outfalls from Stepan/Olin do not indicate significant off-site migration of contamination.

Priority pollutant samples were taken from the drainage ditch paralleling the railroad tracks on July 28, 1980. Analyses of samples taken upstream and downstream of the Stepan/Olin property suggested that small amounts of the priority pollutants listed in Table 2 are generating from the site.

The primary purpose of this site inspection was to gather appropriate samples for analysis to determine if any ground or surface water contamination is generating from Olin property. The sampling plan is presented in Section 4, and the sampling procedures and screening results are included in Section 7.2 of this report. The preliminary results indicate that, with the exception of the "black ooze" and significant amounts of residual heavy hydrocarbons noted in Section 7.2, no significant sources of contamination are present on site. Evidence of buried drums was noted just west of the headwall (See Figure 2). However soil, surface water and groundwater revealed no evidence of hazardous chemicals generating from the burial site.

4. Concept of Operation:

A seven-person team entered this site to identify the nature of materials stored on site, investigate possible sources of contamination and collect appropriate samples for screening and analysis.

Table 2:

Priority Pollutants Suggested To Be Entering the East Drainage Ditch from Olin Property
(Based on July 28, 1980 Priority Pollutant analyses)

CONTAMINANT	METHOD OF CONTACT	HEALTH EFFECTS
Trichloroethylene	Inhalation:	Headache, nausea, drowsiness
	Chronic Inhalation:	Possibly liver damage. (This has not been documented in Humans).
	Inhalation of large quantities:	May cause narcosis
	Ingestion:	Possibly liver damage. (This has not been documented in humans).

Note: TCE is an experimental animal carcinogen. (rats).
1979 recommended ambient water quality criterion 2ug/l
Based on tumors in rats and not on human health affects.

N-Nitrosodiphenylamine	Ingestion only	Not an inhalation hazard.
	Toxicity:	This compound belongs to the class of nitrosamines.

Note: Nitrosamines are suspected human carcinogens. There are no human data, but nitrosamines do cause tumors of the stomach, lung, liver, bladder and kidney in rats. The class criterion is 0.1/ug/l water (ambient water) based on tumor formation in rats.

Bis (2-Ethyl hexyl) phthalate

Note: Phthalates are non-biodegradable and potential aquatic hazards. They have no documented human health effects that may be associated with environmental hazards.

Phthalates are used as plasticizers in latex materials and are often used in medical equipment such as IV infusion sets.

Phthalates may leach off of such equipment and are suspected in the etiology of shock lung syndrome when injected intraveneously.

1,1,2 - Trichloroethane	Toxicity - Inhalation:	Narcotic, local irritant may (B - cause liver and kidney damage.
	Ingestion:	Local irritant (in 1 ug/l concentrations) suspected to cause liver and kidney damage

Note: It may be a percutaneous hazard - when hands are immersed in concentrated liquid (only).

1,2 - trans-Dichloroethylene	Toxicity:	low toxicity except when exposed to concentrated vapor - nausea, vomiting, dizziness with immediate recovery upon removal from exposure.
	Ingestion:	Ingestion of concentrated liquid - hausea, vomiting.

Note: 1,2 - DCE is a dermatitis producing agent. It is not percutaneous.

Vinyl Chloride:

Note: A well-known human carcinogen. 1979 ambient WQ criterian = 51 ug /l based on tumor-production in rats

4. Concept of Operation - continued

The following instruments were used during the visit to delineate potentially hazardous areas and screen samples:

1. Century organic vapor analyzer (OVA)

2. Explosimeter

3. Oxygen meter

The site sampling plan was based upon existing knowledge of groundwater and surface water movement on Olin property. The groundwater contours presented on the overlay for Figure 10 are from a report entitled "Report on Groundwater and Surface Water Study - Stepan Chemical Company, Wilmington, Massachusetts" by Geotechnical Engineers, Inc. of Winchester, Massachusetts (1979). Both groundwater and surface water moves in a northwest to southeast direction. As a result, priority pollutant groundwater and surface water samples were taken near the southeast corner of the site. A priority pollutant groundwater sample was taken near the northwest corner of the site for background data. A total of eight groundwater, ten surface water and five soil samples were taken. The sampling locations are shown in Figure 10. See Section 7.2 of this report for detailed sampling procedures and preliminary screening results. Parameters for the monitoring wells on Olin property are presented in Table 2.

All samples were iced immediately and brought to the EPA Regional Laboratory in Lexington, Massachusetts, for further screening and analysis. Appropriate decontamination measures were followed prior to leaving the site. The safety plan and report are included in Appendix A.

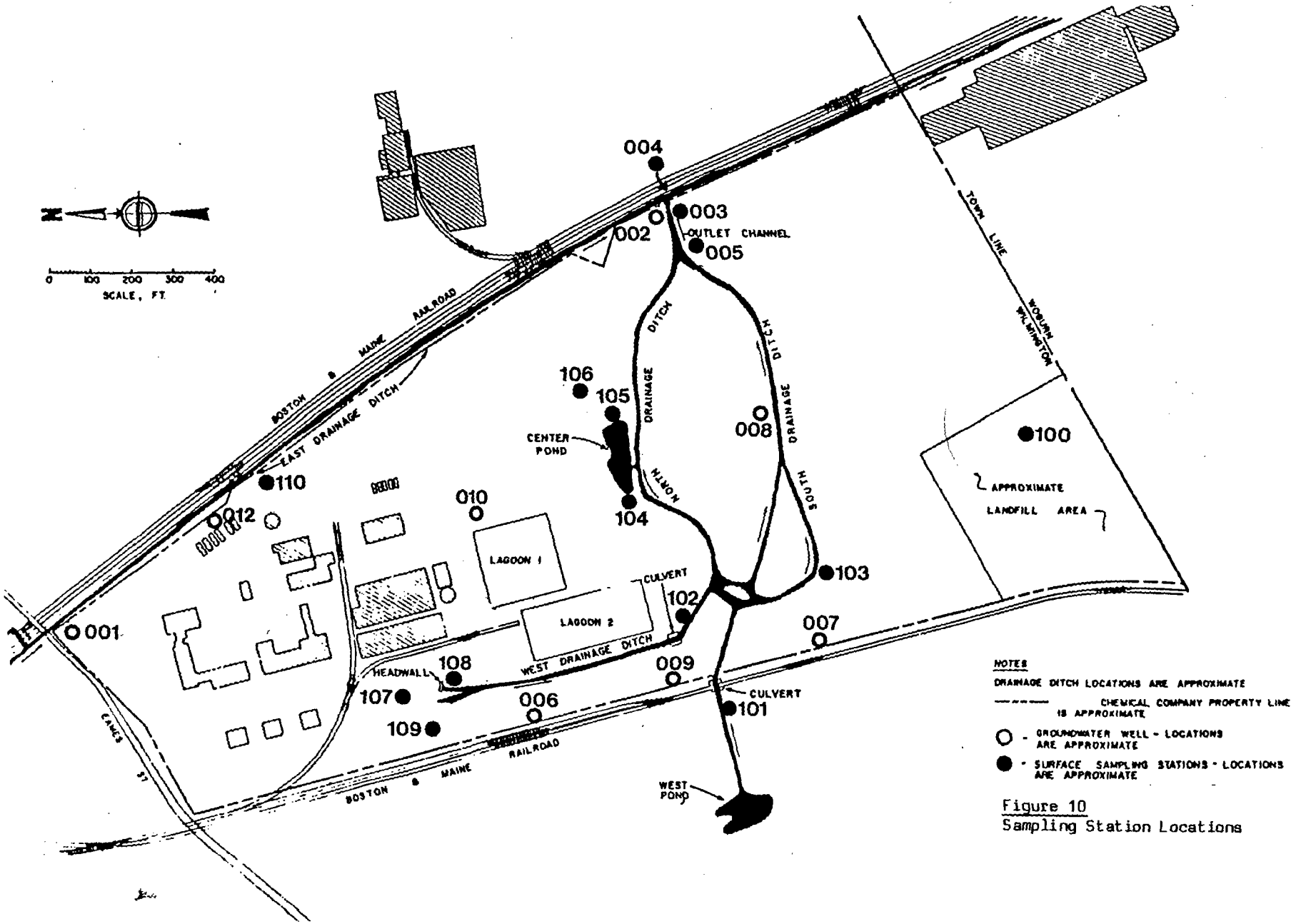


Figure 10
Sampling Station Locations

TABLE 3 - Parameters for Monitoring Wells on the Olin Property in Wilmington, Massachusetts

Well #	Depth of Well (ft.)	Water Table Depth (ft.)	Depth of Screened Section (ft.)
GW - 1	21.2	9.0	14.0 - 19.5
GW - 2	15.0	7.5	9.5 - 14.5
GW - 3	22.0	4.2	10.0 - 15.0
GW - 4	13.5	2.5	8.0 - 13.0
GW - 5	12.0	0	5.0 - 10.0
GW - 6	18.0	4.0	8.2 - 13.2
GW - 7	14.0	2.6	8.5 - 13.5
GW - 8	10.2	1.5	3.2 - 8.2
GW -10	24.0	5.4	4.8 - 9.8
GW -11	17.0	3.9	9.0 - 14.0
GW -12	12.7	0	4.8 - 9.8

- All wells have inside diameters of 1.5".
- Location of wells is shown in Figure 2 of this report.
- All well parameters are from: Report on Groundwater and Surface Water Study - Stepan Chemical Company, Wilmington, Massachusetts: Geotechnical Engineers, Inc. Winchester, Massachusetts, December 6, 1978.

5. Logistics and Site Setup:

Because of the large area covered during this inspection and the large amount of sampling equipment required to accomplish the objective, it was necessary to move the van and associated decon several times. Figure 11 shows the various locations of the van during the inspection. Equipment decontamination was performed after each sampling effort, and appropriate equipment and personnel decontamination measures were performed following the final sampling at Well GW-2 (Station 012).

No hot line was delineated as no "hot spots" were indicated during the preliminary assessment or the site inspection.

No logistical problems were encountered during the planning and performance of this site inspection. A minor pumping problem was encountered during sampling at the first groundwater station (001). However, following appropriate adjustments, samples were successfully retrieved from depths up to ten feet with the portable hand pump. The portability of this sampling technique was very important at Station 008 which was nearly inaccessible due to dense vegetation and swampy ground.

6. Site entry team and Schedule of Events:

6.1 Site Entry Team and Team Assignments:

David Cook	-	Site Entry Team Leader
Paul Clay	-	Sampling Officer
Lori Fucarile	-	Safety Officer
Glenn Smart	-	Equipment/Work Party
Richard DiNitto	-	Work Party
Margret Hanley	-	Work Party
Bill Norman	-	Work Party

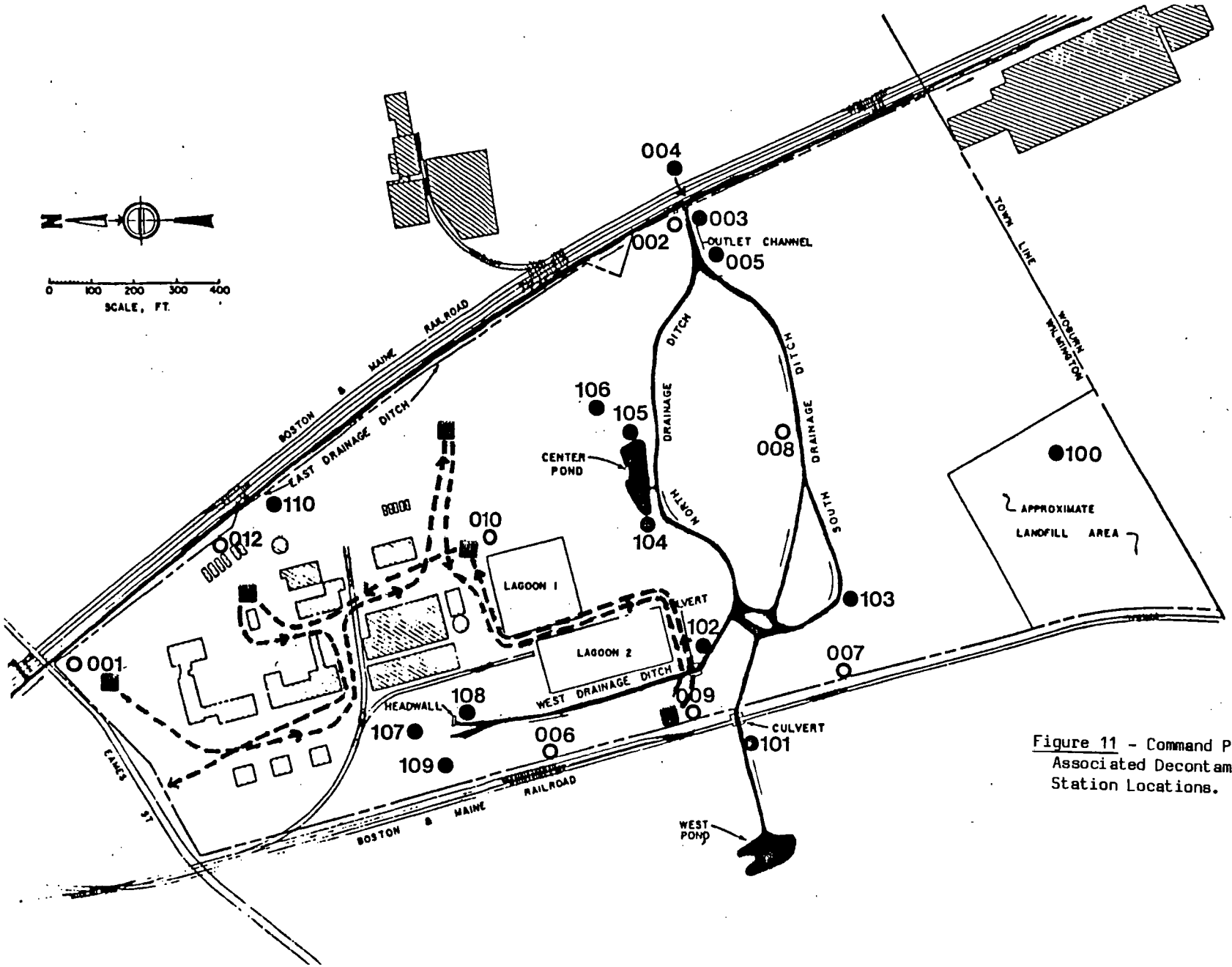


Figure 11 - Command Post and Associated Decontamination Station Locations.

6. Site Entry Team and Schedule of Events - continued

6.2 Schedule of Events

The site entry team was briefed by the team leader on November 11, 1980 (the day before site entry). The briefing included review of appropriate data obtained during the preliminary assessment for the purpose of making the team aware of all potential hazards. The briefing focused the team's attention on the questions raised by the preliminary site assessment.

In order to facilitate completion of sampling on November 12, 1980, the team was divided into two groups: Cook, DiNitto and Hanley (Team 1) collected the surface water and sediment samples and Fucarile, Clay, Smart and Norman (Team 2) collected the groundwater samples.

The following was the schedule of events for the site inspection.

0900 - Van arrives at Olin, team sets up decon and prepares sampling equipment. D. Cook meets with Olin representatives (Ted Groom and M. Ahsah of Olin Research Laboratory, David Vaughn, Environmental Coordinator and Ron McBrien, Plant Manager) and explains the objectives of the inspection. Split samples and duplicate photos are requested by McBrien and Vaughn.

0930 - Smart and Clay sample Well GW-1 (Station 001, Sample #70818).

1038 - Smart and Clay collect priority pollutant sample at Well GW-5 (Station 002, Sample #70809).

1040 - Cook collects priority pollutant sample of surface water at outlet of on-site drainage ditch (Station 003, Sample #70803).

6. Site Entry Team and Schedule of Events

6.2 Schedule of Events - continued

1100 - Clay samples culvert from E. C. Whitney (Station 004, Sample #70814).

1105 - Clay samples surface water from North Drainage Ditch (Station 005, Sample #70815).

1140 - Smart and Clay collect priority pollutant sample from Well GW-10 (Station 006, Sample #70816).

1200 - Team breaks for lunch and discusses sampling completed and still to be completed.

1315 - Team returns to site and divides into two groups described earlier (Teams 1 & 2).

Team 2:

1330 - Smart and Norman sample Well GW-12 (Station 007, Sample #70825).

1400 - Smart, Clay and Norman sample Well GW-8 (Station 008, Sample #70826).

1430 - Smart, Clay and Norman sample Well GW-11 (Station 009, Sample #70827).

1505 - Norman and Smart sample Well GW-6 (Station 010, Sample #70828).

1530 - Clay, Smart and Norman attempt to sample Well GW-7 (Station 011) but are foiled by a wasps' nest in the well.

1545 - Team 2 samples Well GW 2 (Station 012, Sample #70812).

6. Site Entry Team and Schedule of Events

6.2 Schedule of Events - continued

Team 1:

1330 - Sediment sample taken with auger at sulfate sludge landfill (Station 100, Sample #70824).

1345 - Sediment and surface water samples taken on Jewel Industrial Park property just west of culvert leading to Olin property (Station 101, Sample #70817).

1355 - Sediment and surface water samples taken at culvert just south of the Lagoon 2 (Station 102, Sample #70807).

1420 - Surface water sample taken approximately 75 feet east of Well GW-12 (Station 103, Sample #70821).

1440 - Surface water sample taken at west end of Central Pond (Station 104, Sample #70822).

1500 - Surface water sample taken at east end of Central Pond (Station 105, Sample #70823).

1515 - Sediment and surface water samples taken in area of dead trees (Station 106, Sample #99999).

1530 - Soil sample taken where Lake Poly was formerly located (Station 107, Sample #70808).

1540 - Surface water taken near headwell (Station 108, Sample #70810).

1550 - Evidence of buried drums (rusted bands lids and two partially buried drums) noted just west of headwall. Shallow soil sample collected (Station 109, Sample #9998).

1610 - Soil sample taken from area just south of tank farm (Station 110, Sample #99997).

6. Site Entry Team and Schedule of Events

6.2 Schedule of Events - continued

Team 1:

1615 - Teams 1 and 2 reunite at van and proceed to decon personnel and equipment. Chain of custody forms are completed and D. Vaughn of Olin signs for split samples transferred to him.

1640 - Site Inspection completed, team returns to office.

7. Results of Investigation

7.1 Site Representative Interview:

A detailed interview regarding the processes used on site was not necessary as this information was gathered during the preliminary assessment and is incorporated into Section 3.2 of this report. Mr. David Vaughn, Environmental Coordinator for Olin Chemicals Group, did confirm the presence of dioctylphthalate, diphenolamine, dioctylamine and other related chemicals in the "black ooze" seeping into the East Drainage Ditch. The seepage appears to be the result of a spill generating from the tank farm which took place during or prior to 1973. Presented in Appendix C is a letter from Charles P. Riley, Jr., General Manager of National Polychemicals to Thomas C. McMahon, Director of Massachusetts Water Resources Commission, dated July 18, 1973, describing the presence of "black ooze". Mr. Vaughn also confirmed the presence of contamination in Well GW-2 related to this spill and was hesitant to have us sample this well prior to undisclosed remedial action planned by Olin.

Mr. Vaughn expressed his desire to obtain duplicate samples and photographs associated with the site inspection.

7. Results of Investigation - continued

7.2 Sampling procedures and screening results:

7.2.1 Groundwater sampling procedures

The preparation for sampling the monitoring wells on the Olin property was the same in each case: (Note: All wells were capped and bolted. The bolts were sawed off to remove the well cap.)

First, the static level of water in the well was determined with a water level indicator. Second, the bottom of the well was sounded. using these two measurements and the diameter of the well casing (1 1/2", in each case), the static volume of water in the well was calculated. Third, a hand operated vacuum pump attached to a sufficient length of Tygon tubing was used to discharge five times the static volume of the well. (This amount of discharge was not possible in some wells because of slow recharge and silted-in screens.) Following discharge, a volume of sample appropriate for the desired analytical parameters was collected by pumping. E & E personnel first filled their bottles and then filled bottles for Olin sampling personnel.

Between the sampling of each well, the sampling line and pump was cleaned by rinsing thoroughly, first with methanol and then with distilled water. The E & E sampling crew consisted of Paul Clay and Glenn Smart for wells GW-1, 5, and 10 and Paul Clay, Glenn Smart and William Norman for wells GW-12 8, 11, 6, 7, and 2. A groundwater elevation contour map prepared from data gathered during sampling is presented in Figure 12, which is very similar to Figure 10, the groundwater elevation contour map prepared by Geotechnical Engineers. The major difference is that surface of the the water table was generally 1 1/2 to 2 feet lower at the time of the E & E site inspection.

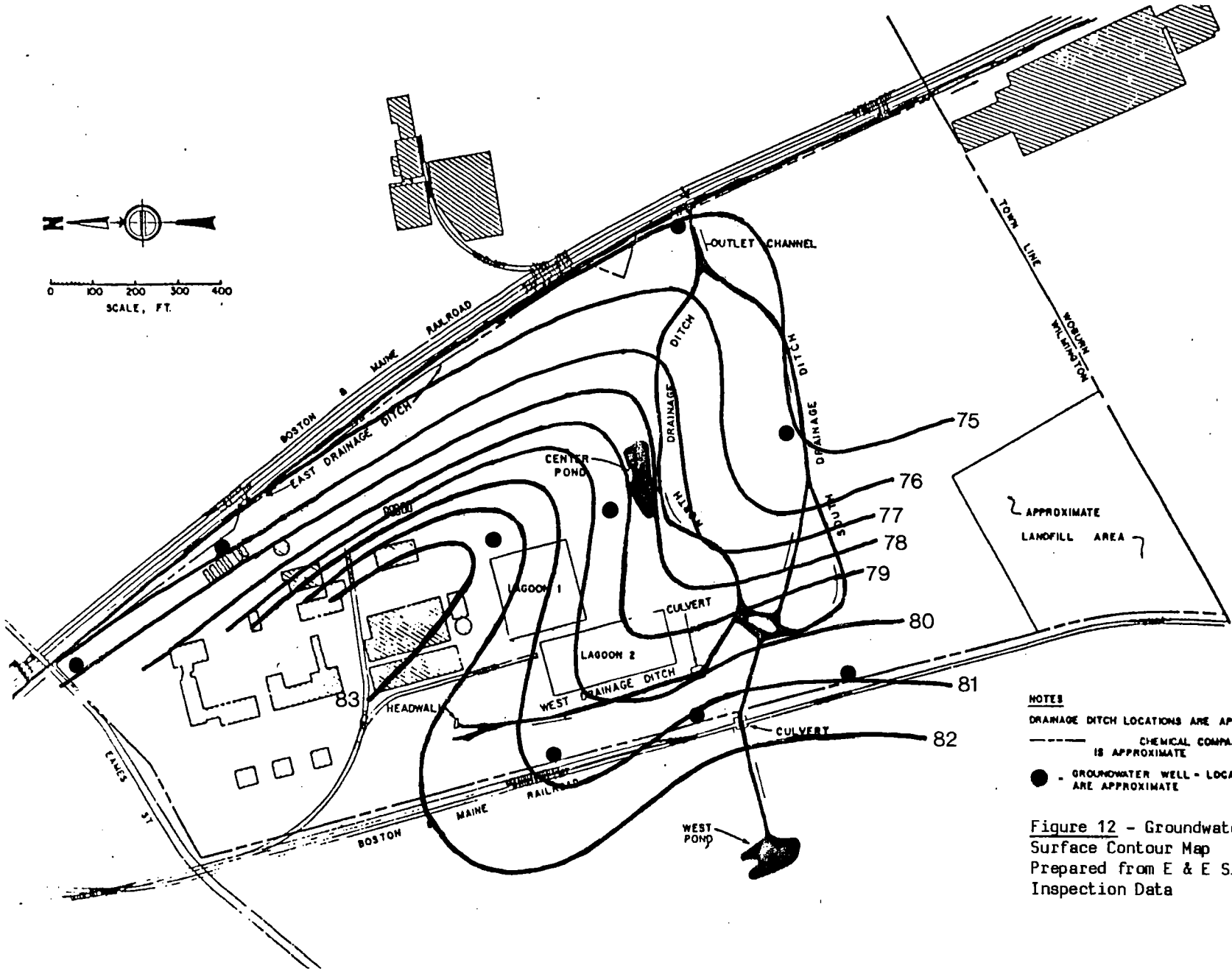


Figure 12 - Groundwater Surface Contour Map Prepared from E & E Site Inspection Data

7. Results of Investigation

7.2 Sampling procedures and screening results:

7.2.1 Groundwater sampling procedures - continued

The following is a summary of the sampling operations and data obtained at each well:

Olin Well GW-1 (Station 001, Sample #70818):
Depth of well: 21' 4"
Depth to water (static level): 11' 4"
Volume purged prior to sampling: 5 gallons
Samples taken: E & E obtained (1) 40 ml VOA vial with 10% head space for screening. Olin representatives obtained 80 ml.

Olin Well GW-5 (Station 002, Sample #70809):
Depth of well: 13' 2 1/2"
Depth to water (static level): 4' 1"
Volume purged prior to sampling: 5 gallons
Samples taken: E & E obtained the following priority pollutant sample:
(2) 1/2 gallon jars with Teflon lined caps for extractables
(2) 40 ml VOA vials for purgeables
(1) 1 liter polyethylene bottle for metals
(1) 40 ml VOA vial with headspace for screening
Olin representatives obtained similar volumes for similar analyses.

Olin Well GW-10 (Station 006, Sample #70816):
Depth of well: 12' 3"
Depth to water (Static level): 8'7"
Volume purged prior to sampling: 3 1/2 gallons
Samples taken: E & E obtained sufficient volume in appropriate containers for priority pollutant

7. Results of Investigation

7.2 Sampling procedures and screening results:

7.2.1 Groundwater sampling procedures - continued

analyses (See description under Well GW-5). Olin representatives obtained similar volumes for analyses.

Olin Well GW-12 (Station 007, Sample #70825):

Depth of well: 12' 1"

Depth to water (static level): 4' 7"

Volume purged prior to sampling: 3 1/2 gallons

Samples taken: E & E obtained (1) 40 ml VOA vial with 10% head space for screening. Olin representatives obtained 80 ml.

Note: Due to the fact that leaves and other debris were pumped as this well was purged, it is likely that the well casing is broken below the water table.

Olin Well GW-8 (Station 008, Sample #70826):

Depth of well: 10'10"

Depth to water (static level): 5'1"

Volume purged prior to sampling: 3 1/2 gallons

Samples taken: E & E obtained (1) 40 ml VOA vial with 10% headspace for screening. Olin representatives obtained 80 ml.

Note: Water had a brown, murky color throughout the purging and sampling processes.

Olin Well GW-11 (Station 009, Sample #70827):

Depth of well: 15' 9"

Depth to water (static level): 6'3"

Volume purged prior to sampling: 3 1/2 gallons

Samples taken: E & E obtained (1) ml VOA vial with 10% head space for screening. Olin representatives obtained 80 ml.

7. Results of Investigation

7.2 Sampling procedures and screening results:

7.2.1 Groundwater sampling procedures - continued

Olin Well GW-6 (Station 010, Sample #70828):

Depth of well: 15' 1"

Depth to water (Static level): 5'11"

Volume purged prior to sampling: 3 1/2 gallons

Samples taken: E & E obtained (1) 40 ml VOA vial with 10% head space for screening. Olin representatives obtained 80 ml.

Olin Well GW-7 (Station 011, Sample #70811):

Depth of well: 16' 0"

Depth to water (static level): 5'4"

Volume purged prior to sampling: under two gallons

Samples taken: No samples taken.

Note: Well was clogged with wasps.

Olin Well GW-2 (Station 012, Sample #70812)

Depth of well: 16' 9"

Depth to water (static level): 12' 5"

Note: This well was highly contaminated with an oily substance, most likely dioctylphthalate.

Volume prior to sampling: Because of the depth of the well and the high viscosity of the contaminant, it was not possible to obtain more than a quart of material from this well. The intent was to take sufficient volume for a priority pollutant analysis. The volume obtained was split with Olin representatives. The sample was very obviously two-phase, with a top dark brown layer and a bottom aqueous layer.

7. Results of Investigation

7.2 Sampling procedures and screening results:

7.2.2 Surface water and sediment sampling procedures:

With the exception of the priority pollutant surface water sample collected at Station 003, all sediment and surface water samples consisted of (1) 40 ml VOA vial with head space. All sediment samples were collected with a four-inch diameter soil auger. The locations of all sampling stations are shown in Figure 10.

Station 100 - Sample #70824

A sample from the sulfate sludge landfill was taken approximately one foot below the surface. The sample was greyish-white in color and had the consistency of wet clay.

Station 101 - Sample #70817

A mucky sediment sample was taken in the drainage channel approximately six inches below the channel bottom. A surface water sample was also collected at this station. The water was clear and colorless.

Station 102 - Sample #70807

A surface water sample was initially taken. Upon seeing a bubble of material breakout onto the water surface in a rainbow - colored sheen, it was decided to take a sediment sample. The sediment sample was taken approximately six inches below the channel bottom. It was black and impregnated with a thick black oily substance. A heavy rainbow-colored sheen covered the entire drainage channel as oily material seeped to the surface of the water from the hole made by the auger. Another surface water sample was subsequently taken. The water was clear and slightly brownish in color.

Station 103 - Sample #70821

A surface water sample was taken from a large puddle of standing water located in a depression resulting from recent (?) earth movement. The water was clear and colorless.

7. Results of Investigation

7.2 Sampling procedures and screening results:

7.2.2 Surface water and sediment sampling procedures:

Station 104 - Sample #70822

A surface water sample was taken. The water was clear and colorless.

Station 105 - Sample #70823

A surface water sample was taken. The water was clear and colorless.

Station 106 - Sample #99999

A black mucky sediment sample was taken approximately six inches below the surface. The auger hole was allowed to recharge with water and a water sample was subsequently taken. The water was clear and colorless.

Station 107 - Sample #70808

A surface water sample was taken. The water was clear and colorless and was moving swiftly in the channel.

Station 108 - Sample #70810

A sandy, grey-colored, water soaked sediment sample was taken approximately four feet below the ground surface. Material above the sample location was light-tan, coarse grained sand.

Station 109 - Sample #99998

A black, mucky sediment sample was taken approximately six inches below the surface. The entire area where this sample was taken was resilient when jumped upon. The collected sample had the odor of fuel oil.

Station 110 - Sample #99997

A dark, fine-grained soil sample was collected approximately six inches below the ground surface.

7. Results of Investigation

7.2 Sampling procedures and screening results:

7.2.2 Surface water and sediment sampling procedures:

Station 003 - Sample #70803

A priority pollutant sample was taken of the surface water. There was a thin sheen on the surface of the water. The water was clear and colorless.

Station 004 - Sample #70814

A sample was taken of the standing water at the outlet of the culvert. The water which was clear and colorless was covered with the thick sheen.

Station 005 - Sample #70815

A sample was taken of the surface water. It was clear and colorless.

7.2.3 Screening results of surface water and groundwater samples

The samples specified below were screened on a Century Portable Gas Chromatograph using a T-12 column. All samples were shaken vigorously for two minutes and allowed to reach ambient temperature. 250 microliters (ul) of the headspace vapor were then withdrawn and injected directly into the detector to measure the total volatile hydrocarbon content. Those samples showing volatiles were then run again, but in the gas chromatograph mode. The results follow:

Olin Well GW-1 - Sample #70818

Large methane peak, followed by smaller, fast second peak - unidentified, possibly a higher alkane

Olin Well GW-5 - Sample #70809

Methane peak, no other volatiles within detection limit pH of sample = 6-8. Sample submitted for priority pollutant analysis.

Olin Well GW-10 - Sample #70816

Large methane peak, followed by smaller, fast second peak - unidentified, possibly a higher alkane. Sample submitted for priority pollutant analysis.

7. Results of Investigation

7.2 Sampling procedures and screening results - continued

7.2.3 Screening results of surface water and groundwater samples

Olin Well GW-12 - Sample #70825

No volatiles present within detection limits. pH of sample = 6-8.

Olin Well GW-8 - Sample #70826

No volatiles present within detection limits. pH of sample 4-6.

Olin Well GW-11 - Sample #70827

Large methane peak, followed by smaller, fast second peak - unidentified, possibly a higher alkane.

Olin Well GW-6 - Sample #70828

Methane peak, followed by small fast peak - unidentified, possibly a higher alkane.

Olin Well GW-7 - Not analyzed

No sample obtained

Olin Well GW-2 - Not analyzed

Olin has confirmed presence of dioctylphthalate in the well.

Olin/West End of Central Pond - Sample #70822

No volatiles within detection limits. pH = 6-8

Olin/Jewel Drive side of culvert - Sample #70817

No volatiles within detection limits. pH = 6-8

Olin/Channel near well #5 - Sample #70803

Methane, then very small second peak - not identified. Sample submitted for priority pollutant analysis.

7. Results of Investigation

7.2 Sampling procedures and screening results - continued

7.2.3 Screening results of surface water and groundwater samples

Olin/Culvert southeast of sulfate lagoon - Sample #70807

Methane, then very small second peak - not identified.

Olin/East End of Central pond - Sample #70823

No volatiles present within detection limits. pH of sample 6-8.

Olin/Non Contact Cooling Water - west end of warehouse - Sample #70810

Methane present.

Olin/North Drainage Ditch - Sample #70815

Methane present. No other volatiles within detection limit. pH = 6-8.

Olin Standing Water near Well GW-12 - Sample #70821

No volatiles present within detection limits. pH = 6-8

Olin/Surface Water near vegetative stress area - Sample #99999

No volatiles present within detection limits. pH = 6-8.

7.2.4 Screening results of soil and sediment samples.

An attempt will be made to analyze for the presence of volatile vapors in these samples by allowing the samples to reach room temperature and injecting a portion of the head space vapor into the portable GC. Since the column of the portable GC operates at ambient temperature, it is not practical to heat up the sediment samples to drive off vapor, as the vapor might condense in the column and thereby destroy the column.

7. Results of Investigation

7.2 Sampling procedures and screening results - continued

7.2.5 Photographs of Sampling Points

Figures 13 through 30 are photographs of the sampling locations.

8. Recommendations:

E & E has made arrangements with Olin to collect a priority pollutant sample at Well GW-2 to determine the extent of contamination. A pump capable of sampling this well is on order. With this exception, no additional on-site inspection or sampling activity of this site is warranted at this time. Should the priority pollutant analyses indicate unanticipated contamination, the need for re-entry will be evaluated.

The East Drainage Ditch should be examined regularly to determine if the absorbant pads now in place are preventing the entry of phthalates, amines and phenols into the ditch. There is an obvious need for remedial action to eliminate the ongoing contamination of a Class B stream (East Drainage Ditch) with priority pollutants including dioctylphthalate and possibly diphenyl hydrazine as well as various phenols and amines.

To avoid repeated spills of hazardous materials from the tank farm, it is recommended that an impervious base and confinement structure be provided.

The release of heavy fuel oil from oil impregnated soil into the North Drainage Ditch is taking place. The placing of absorbant pads at the entrance of this ditch into the East Drainage Ditch is recommended.

9. Conclusions:

The seepage from Olin property of at least one priority pollutant (dioctylphthalate) into a Class B stream is presently occurring.

This contamination is very likely entering the Aberjona River by way of Halls' Brook Storage Area.

A monitoring well located on Olin property is grossly contaminated with at least one priority pollutant.

There is extensive contamination of soil on Olin property with heavy residual oil.

A completed Potential Hazardous Waste Site - Site Inspection Report is included in Appendix B.

Figure 13: Sampling Station 001

Figure 14: Sampling Station 002

Figure 15: Sampling Station 003

Figure 16: Sampling Station 004

Figure 17: Sampling Station 005

Figure 18: Sampling Station 006

Figure 19: Sampling Station 007

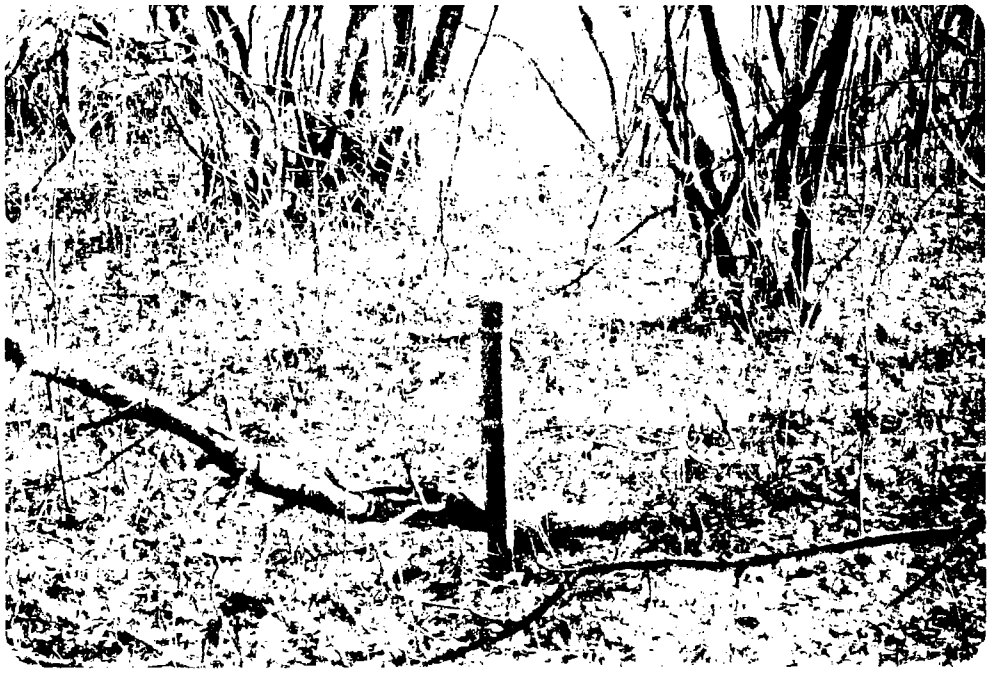


Figure 20: Sampling Station 008

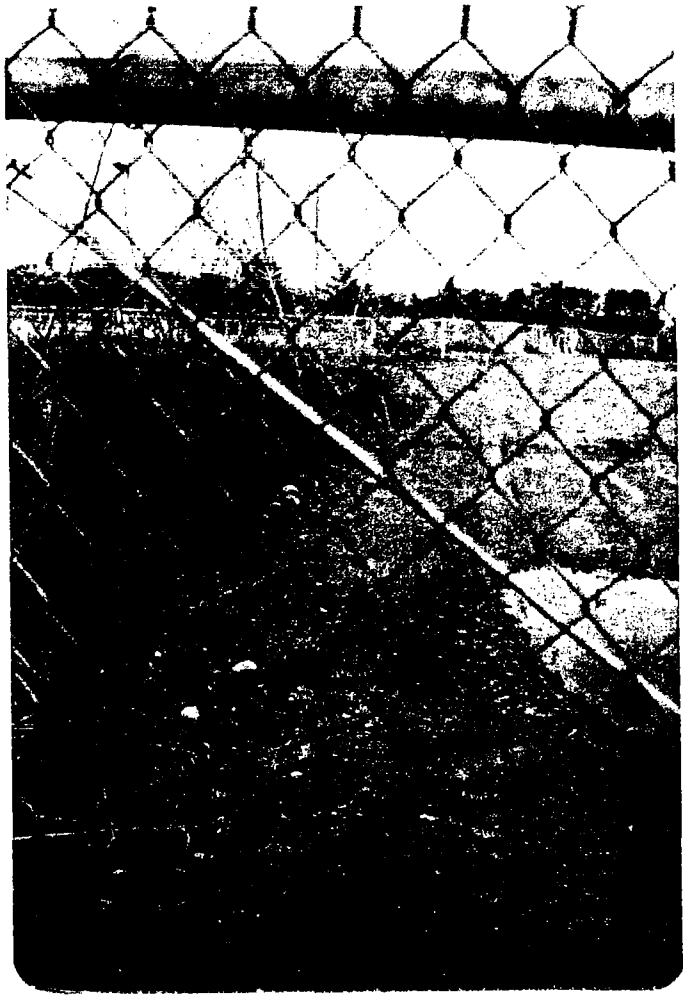


Figure 21: Sampling Station 009

Figure 22: Sampling Station 010

Figure 23: Sampling Station 012

Figure 24: Sampling Station 102

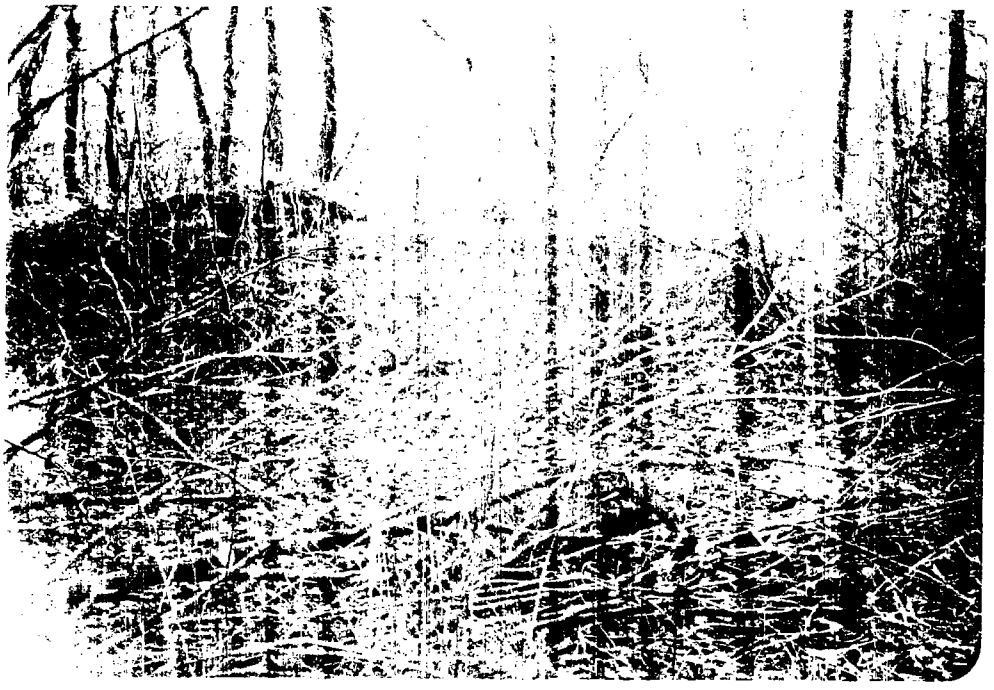


Figure 25: Sampling Station 103

Figure 26: Sampling Station 104

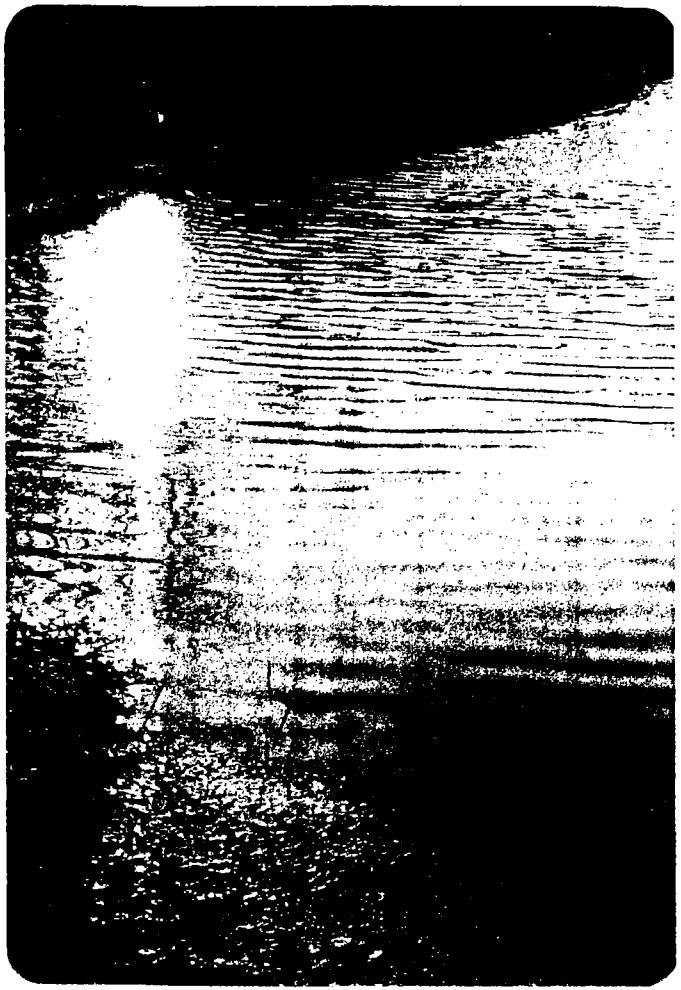


Figure 27: Sampling Station 105

Figure 28: Sampling Station 106

Figure 29: View toward the northwest from Sampling Station 106

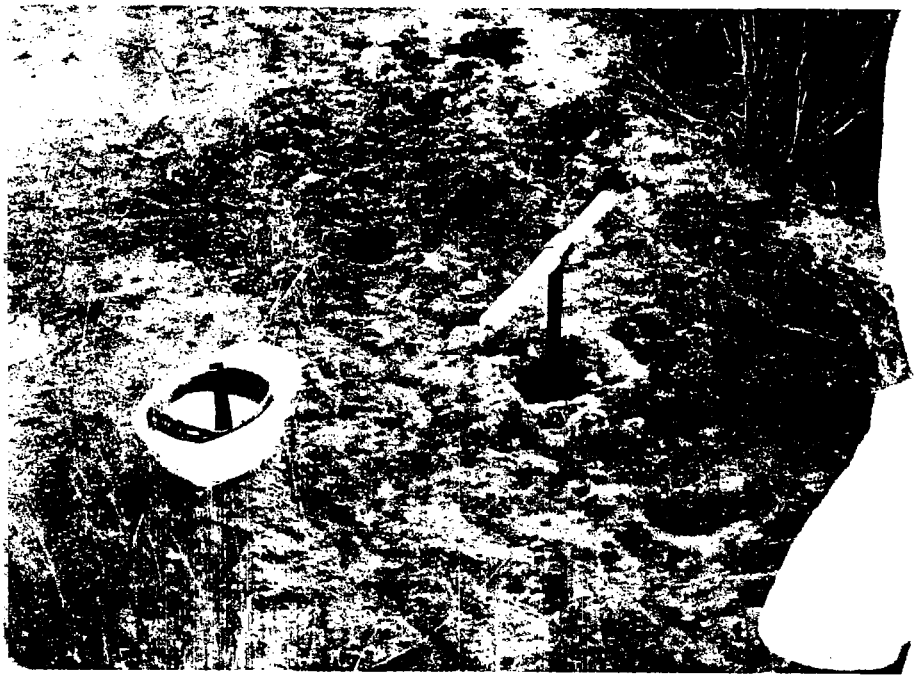


Figure 30: Sampling Station 108

APPENDIX A

SITE SAFETY PLAN

and

REPORT

FIELD INVESTIGATION TEAM - REGION 1

SITE SAFETY PLAN

TE: Olin Chemicals Group Plant DATE: 10/23/80 TDD #: 1-8005-01

CATION: Eames Street, Wilmington, MA PREPARED BY: Fucarile/Desmarais

VESTIGATIVE OBJECTIVE(S): To gather information necessary to determine the potential for RCRA and/or 311/104 Clean Water Act action PROPOSED DATE OF INVESTIGATION: 11/5/80

CKGROUND REVIEW: Complete: x Preliminary: ___

CUMENTATION/SUMMARY: OVERALL HAZARD: Serious ___ Moderate x Low ___ Unkno

SITE/WASTE CHARACTERISTICS

STE TYPE(S): Liquid x Solid x Sludge x Gas ___

ARACTERISTIC(S): Corrosive x Ignitable ___ Radioactive ___ Volatile x Toxic ___ React. ___ Unk. ___ Ot

CILITY DESCRIPTION: Size: 53 acres Buildings: approx. 7 buildings

11 storage tanks, 12 wells

Topography: embankment to ditch at RR tracks, marshland at back of property

Principal Disposal method (type and location): formerly three acid pits, now rectangular settling basins used for gypsum containment, storage tanks

Unusual Features (dike integrity, power lines, terrain, etc.) boardered by B&M RR tracks

Status: (open, closed, unknown) open

STORY: (worker or non-worker injury; complaints from public; previous agency action):

Analysis of sludge Nat'l Polychemicals, Inc. 1970 leaching into Aberjona. Geotechnical Engineers Study PVC liner leaks in 1979, Complaints to MDC regarding high chloride, sulfate and ammonia levels in sewer. Former Stepan employee unofficially reported phosphorus trichlori dumped on ground and residues buried near wetlands. He was taken to hospital for oxygen because he was overcome by ammonia fumes inside building.

HAZARD EVALUATION

Moderate Hazard, After close examination of the Geotech. Study, Nat'l Polychemical Study etc. The only priority pollutants presumed to be on site are toluene and dioctylphalate. It is highly likely that toluene would have volatilized soon after a spill. Dioctylphalate is not a vapor hazard. Toluene could be a vapor hazard if it is leaking. Ultra twins should be worn. Also, could have acidic or basic leachates thus rubber gloves and boots and apron protection. Eye protection taken care of by Ultra Twin masks. Other non priority pollutants which may be on site could be ingestion hazards; therefore, reasonable hygene should be practiced.

ECOLOGY AND ENVIRONMENT, INC.

FIELD INVESTIGATION TEAM - REGION I

WORK PLAN INSTRUCTIONS

I. PERIMETER ESTABLISHMENT: Map/Sketch Attached x [c] Site Control ____
Public Perimeter Identified x Zone(s) of Contamination Identified x
NOTES:

[c] areas of special safety concern identified

I. PERSONAL CLOTHING:
Level of Protection: A ____ B ____ C x D ____
Modifications: _____

Surveillance Equipment and Materials: TLD badges

I. DECONTAMINATION PROCEDURES:
Hot Line Location (initial): at public perimeter access
Command Post Location (initial): at public perimeter access
PDS Stations: 1. boot & glove wash 2. boot & glove rinse
3. _____ 4. _____ 5. _____
Equipment and Materials/Special Facilities: _____

V. SITE ENTRY PROCEDURES:
Team Size: E & E 5 State ____ Other ____
Entry Briefing (date) day before site entry
Station Designation (name/responsibility): 1. Dave Cook, Project Leader
2. Paul Clay, Equipment/Work party 3. Lori Fucarile, Safety
4. Robert Palermo, Work party 5. Paul Exner, Work party
6. _____ 7. _____
Work Schedule/Limitations:
Site entry team will not be entering any buildings. Entry to (outside) area will be done only after receiving permission from Olin Chemical.
Notes: _____

ECOLOGY AND ENVIRONMENT, INC.

FIELD INVESTIGATION TEAM - REGION I

ORK PLAN INSTRUCTIONS - continued

. EMERGENCY PRECAUTIONS:

ACUTE EXPOSURE SYMPTOMS	FIRST AID
Volatile hydrocarbon exposure: lightheadedness, nausea	Get to fresh air, administer oxygen if required. Seek medical aid

HOSPITALS/POISON CONTROL CENTERS (address, telephone number)

See Resources List

EMERGENCY TRANSPORTATION SYSTEMS (Fire, police, ambulance)

See Resources List

.EMERGENCY ROUTES

Choate Hospital, Left from Olin gate onto Eames St. to Route 38, left on 38 (Main Street) straight (Under 128) to Woburn Center approx 1.5 miles to Warren Ave. Choate Hospital is at top of hill.

EQUIPMENT CHECKOUT

SCBA		Cylinders		Eye Wash Unit	x
Ultratwin	x	Cartridges	x	First Aid Kit	x
Explosimeter			x	Drinking Water Supply	x
O_2 Indicator			x	Personal Clothing	x
Draeger Pump	x	Tubes	x	Decontamination Mat'ls.	x
Radiation Survey Meter					
Radiation Contamination Meter			x		

ECOLOGY AND ENVIRONMENT, INC.

FIELD INVESTIGATION TEAM - REGION I

SITE SAFETY PLAN SUMMARY

NAME OF SITE: Olin Chemical Group DATE: 10/23/80

TDD #: F-1-8005-01F

Location of site: Eames Street, Wilmington, MA

Directions to site: Washington Street North to West Street. Left on Industrial Way, right on Woburn Ave., then left on Eames Street.

Project Leader/Site Entry Leader: David Cook

Safety Person: Lori Fucarile

Equipment Person: Paul Clay

Work Party: Paul Clay, David Cook, Palermo, Paul Exner

Reason for Site Entry: to determine potential for RCRA/311/104 action

Special Hazards: Volatile hydrocarbons may be present; acid or base may be present

Hazard Assessment: (H, M, L, Unk.) Moderate, High levels of contaminants not expected

Level of Protection: Level C

Required Protective Equipment:

1. Ultra Twin w/cartridge
2. Robert Shaw
3. Tyveks (Chem. Resistant)
4. Gloves
5. boots
6. hard hats
7. TLD badges
8. Butyl rubber aprons
9. Explosimeter
10. O_2 Meter

SITE: Olin Chemical Group Plant TDD #: F-1-8005-01F DATE: 10/23/80

RESOURCES
(locate resources on area map)

	NAME	TOWN	PHONE	NOTIFIED YES/NO
FIRE	Wilmington	Wilmington	658-3200	no
POLICE	Wilmington	Wilmington	658-3200	no
AMBULANCE	Wilmington	Wilmington	658-3200	no
HOSPITAL ER	Choate Hospital	Warren Ave., Woburn	933-6700	no
WATER SUPPLY	on van			
TELEPHONE	Olin Chemical	Eames St, Wilmington, MA	933-4240	yes
RADIO COMMUNICATIONS	NA			
AIRPORT	NA			
HELIPORT AREA	NA			
EXPLOSIVES UNIT	State Police	S. Lynnfield	593-1122	no
EPA CONTACT	Rick Leighton	Lexington/NERL	861-6700	yes

LIST OTHER RESOURCES:

EMERGENCY NUMBERS

E & E, Inc., Woburn	(617) 935-0228	(0238) (4008)
E & E, Inc. Arlington, VA	(703) 522-6065	24 hr. number - call forwarding
Dr. Harbison - Vanderbilt	(615) 322-4754	
Dr. Harbison - home	(615) 747-6353	24 hr. number - 9 second message
Robert Young - home	(617) 545-4905	
Anne Marie Desmarais - home	(617) 897-5306	
Peter Bent Brigham, Occup. Ind. Health Clinic:		
Dr. Speizer, Dr. Shenker, Kay Jordan	(617) 732-5983	
24 hour number - ask for bellboy 904	(617) 732-6000	

ECOLOGY AND ENVIRONMENT, INC.
FIELD INVESTIGATION TEAM - REGION I

SITE SAFETY REPORT

NAME OF SITE: Olin Chemicals Group DATE OF ENTRY: 11/12/80
TDD #: F-1-8005-01F

Reason for Site Entry: To obtain information and samples for possible RCRA and/or 311/104 Clean Water Act actions regarding Olin Chemicals Group.

Personnel on Site:

Site Entry Leader: David Cook
Safety Person: Lori Fucarile
Equipment Person: Paul Clay
Work Party: Paul Clay, Glenn Smart, Margret Hanley, Richard DiNitto

Other E & E Personnel:

Other Personnel on Site: Ted Groom, M. Ahsah, and D.Vaughn (Olin Research)

Explain Any YES Answer on an Attached Sheet:	YES	NO
1. Was the Safety Plan followed as presented? Explain any and all deviations in full.	x	
2. Did any team member report chemical exposure?		x
3. Did any team member report illness, discomfort, or unusual symptoms?		x
4. Did any team member report environmental problems? (heat, cold, etc.)		x
5. Did any team member report injury?		x
6. Did the site entry have to be curtailed for any reason? (rain, lack of air, etc.)		x
7. Were any emergency services or resources utilized?		x
8. Were there any unusual occurences?		x
9. Was the Safety Plan adequate?	x	

10. What changes would you recommend? None

APPENDIX B

POTENTIAL HAZARDOUS WASTE SITE

SITE INSPECTION REPORT

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

REGION: I

SITE NUMBER (to be assigned by Hq):

GENERAL INSTRUCTIONS: Complete Sections I and III through XV of this form as completely as possible. Then use the information on this form to develop a Tentative Disposition *(Section II)*. File this form in its entirety in the regional Hazardous Waste Log File. Be sure to include all appropriate Supplemental Reports in the file. Submit a copy of the forms to: U.S. Environmental Protection Agency; Site Tracking System; Hazardous Waste Enforcement Task Force *(EN-335)*; 401 M St., SW; Washington, DC 20460.

I. SITE IDENTIFICATION

A. SITE NAME	B. STREET *(or other identifier)*		
Olin Chemicals Group-Wilmington Plant	Eames Street		
C. CITY	**D. STATE**	**E. ZIP CODE**	**F. COUNTY NAME**
Wilmington	MA	01887	Middlesex

G. SITE OPERATOR INFORMATION

1. NAME		2. TELEPHONE NUMBER	
Mr. Ron McBrien (Plant Manager)		933-4240	
3. STREET	**4. CITY**	**5. STATE**	**6. ZIP CODE**
Eames Street	Wilmington	MA	01887

H. REALTY OWNER INFORMATION *(if different from operator of site)*

1. NAME		2. TELEPHONE NUMBER	
N/A			
3. CITY		**4. STATE**	**5. ZIP CODE**

I. SITE DESCRIPTION

Complex of Chemical Process Buildings on a large wooded lot

J. TYPE OF OWNERSHIP

☐ 1. FEDERAL ☐ 2. STATE ☐ 3. COUNTY ☐ 4. MUNICIPAL ☒ 5. PRIVATE

II. TENTATIVE DISPOSITION *(complete this section last)*

A. ESTIMATE DATE OF TENTATIVE DISPOSITION *(mo., day, & yr.)*	B. APPARENT SERIOUSNESS OF PROBLEM
	☐ 1. HIGH ☒ 2. MEDIUM ☐ 3. LOW ☐ 4. NONE

C. PREPARER INFORMATION

1. NAME	2. TELEPHONE NUMBER	3. DATE *(mo., day, & yr.)*
David K. Cook	935-4008	12/4/80

III. INSPECTION INFORMATION

A. PRINCIPAL INSPECTOR INFORMATION

1. NAME	2. TITLE	
David K. Cook	Sr. Geological Engineer	
3. ORGANIZATION		**4. TELEPHONE NO. *(area code & no.)***
Ecology and Environment, Inc. (E&E)		617-935-4008

B. INSPECTION PARTICIPANTS

1. NAME	2. ORGANIZATION	3. TELEPHONE NO.
David K. Cook	Ecology and Environment, Inc.	935-4008
Paul Clay	Ecology and Environment, Inc.	935-4008
Richard DiNitto	Ecology and Environment, Inc.	935-4008
Margret Hanley	Ecology and Environment, Inc.	935-4008
William Norman	Ecology and Environment, Inc.	935-4008
Glenn Smart	Ecology and Environment, Inc.	935-4008
Lori Fucarile	Ecology and Environment, Inc.	935-4008

C. SITE REPRESENTATIVES INTERVIEWED *(corporate officials, workers, residents)*

1. NAME	2. TITLE & TELEPHONE NO.	3. ADDRESS
David Vaughn	Environmental Coordinator 203-356-3156	Hartford, CT
Ted Groom	Chemist 203-356-3156	Hartford, CT
M. Ahsah	Chemist 933-4240	Wilmington, MA

Continued From Front

III. INSPECTION INFORMATION *(continued)*

D. GENERATOR INFORMATION *(sources of waste)*

1. NAME	2. TELEPHONE NO.	3. ADDRESS	4. WASTE TYPE GENERATED
Olin		Wilmington	Chemicals associated with rubber blowing agent manufacture

E. TRANSPORTER/HAULER INFORMATION

1. NAME	2. TELEPHONE NO.	3. ADDRESS	4. WASTE TYPE TRANSPORTED
N/A			

F. IF WASTE IS PROCESSED ON SITE AND ALSO SHIPPED TO OTHER SITES, IDENTIFY OFF-SITE FACILITIES USED FOR DISPOSAL.

1. NAME	2. TELEPHONE NO.	3. ADDRESS
N/A		

G. DATE OF INSPECTION *(mo., day, & yr.)*	H. TIME OF INSPECTION	I. ACCESS GAINED BY: *(credentials must be shown in all cases)*
11/12/80	0900-1630	[X] 1. PERMISSION [ ] 2. WARRANT

J. WEATHER *(describe)*

Clear/Cold

IV. SAMPLING INFORMATION

A. Mark 'X' for the types of samples taken and indicate where they have been sent e.g., regional lab, other EPA lab, contractor, etc. and estimate when the results will be available.

1. SAMPLE TYPE	2. SAMPLE TAKEN *(mark 'X')*	3. SAMPLE SENT TO:	4. DATE RESULTS AVAILABLE
a. GROUNDWATER	X	Regional lab (2 priority)	1/10/81
b. SURFACE WATER	X	Regional lab (1 priority)	1/10/81
c. WASTE			
d. AIR			
e. RUNOFF			
f. SPILL			
g. SOIL	X	Regional lab	1/10/81
h. VEGETATION			
i. OTHER *(specify)*			

B. FIELD MEASUREMENTS TAKEN *(e.g., radioactivity, explosivity, PH, etc.)*

1. TYPE	2. LOCATION OF MEASUREMENTS	3. RESULTS
Explosivity	Various	Consistently 0
O_2 Meter	Various	Consistently 20
pH	All Well Samples	6-8

Continue On Page 3

Continued From Page 2

IV. SAMPLING INFORMATION *(continued)*

C. PHOTOS

1. TYPE OF PHOTOS: [X] a. GROUND [X] b. AERIAL

2. PHOTOS IN CUSTODY OF: E&E

D. SITE MAPPED?

[X] YES. SPECIFY LOCATION OF MAPS: E&E

E. COORDINATES

1. LATITUDE *(deg.-min.-sec.)*: 42° 31' 50"

2. LONGITUDE *(deg.-min.-sec.)*: 71° 9' 30"

V. SITE INFORMATION

A. SITE STATUS

[X] 1. ACTIVE *(Those inductrial or municipal sites which are being used for waste treatment, storage, or disposal on a continuing basis, even if infrequently.)*

[ ] 2. INACTIVE *(Those sites which no longer receive wastes.)*

[ ] 3. OTHER *(specify)*: _____ *(Those sites that include such incidents like "midnight dumping" where no regular or continuing use of the site for waste disposal has occurred.)*

B. IS GENERATOR ON SITE?

[ ] 1. NO [X] 2. YES *(specify generator's four-digit SIC Code)*: 2821

C. AREA OF SITE *(in acres)*: 53

D. ARE THERE BUILDINGS ON THE SITE?

[ ] 1. NO [X] 2. YES *(specify)*: approx. 20 Process Buildings

VI. CHARACTERIZATION OF SITE ACTIVITY

Indicate the major site activity*(ies)* and details relating to each activity by marking 'X' in the appropriate boxes.

'X'	A. TRANSPORTER	'X'	B. STORER	'X'	C. TREATER	'X'	D. DISPOSER
	1. RAIL		1. PILE		1. FILTRATION		1. LANDFILL
	2. SHIP		2. SURFACE IMPOUNDMENT		2. INCINERATION		2. LANDFARM
	3. BARGE		3. DRUMS		3. VOLUME REDUCTION		3. OPEN DUMP
	4. TRUCK	X	4. TANK, ABOVE GROUND		4. RECYCLING/RECOVERY	X	4. SURFACE IMPOUNDMENT
	5. PIPELINE		5. TANK, BELOW GROUND	X	5. CHEM./PHYS./TREATMENT		5. MIDNIGHT DUMPING
	6. OTHER *(specify)*:		6. OTHER *(specify)*:		6. BIOLOGICAL TREATMENT		6. INCINERATION
					7. WASTE OIL REPROCESSING		7. UNDERGROUND INJECTION
					8. SOLVENT RECOVERY		8. OTHER *(specify)*:
					9. OTHER *(specify)*:		Possible buried drums

E. SUPPLEMENTAL REPORTS: If the site falls within any of the categories listed below, Supplemental Reports must be completed. Indicate which Supplemental Reports you have filled out and attached to this for..

[X] 1. STORAGE [ ] 2. INCINERATION [ ] 3. LANDFILL [ ] 4. SURFACE IMPOUNDMENT [ ] 5. DEEP WELL

[ ] 6. CHEM/BIO/PHYS TREATMENT [ ] 7. LANDFARM [ ] 8. OPEN DUMP [ ] 9. TRANSPORTER [ ] 10. RECYCLOR/RECLAIMER

VII. WASTE RELATED INFORMATION

A. WASTE TYPE

[X] 1. LIQUID [ ] 2. SOLID [X] 3. SLUDGE [ ] 4. GAS

B. WASTE CHARACTERISTICS

[X] 1. CORROSIVE [ ] 2. IGNITABLE [ ] 3. RADIOACTIVE [X] 4. HIGHLY VOLATILE

[X] 5. TOXIC [ ] 6. REACTIVE [X] 7. INERT [ ] 8. FLAMMABLE

[ ] 9. OTHER *(specify)*:

C. WASTE CATEGORIES

1. Are records of wastes available? Specify items such as manifests, inventories, etc. below.

Yes-inventories

Continued From Front

VII. WASTE RELATED INFORMATION *(continued)*

2. Estimate the amount *(specify unit of measure)* of waste by category; mark 'X' to indicate which wastes are present.

a. SLUDGE	b. OIL	c. SOLVENTS	d. CHEMICALS	e. SOLIDS	f. OTHER
AMOUNT	AMOUNT: UNK	AMOUNT	AMOUNT: UNK	AMOUNT	AMOUNT
UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE
(1) PAINT, PIGMENTS	X (1) OILY WASTES	(1) HALOGENATED SOLVENTS	X (1) ACIDS	(1) FLYASH	(1) LABORATORY, PHARMACEUT.
(2) METALS SLUDGES	(2) OTHER *(specify)*:	(2) NON-HALOGNTD. SOLVENTS	(2) PICKLING LIQUORS	(2) ASBESTOS	(2) HOSPITAL
(3) POTW		(3) OTHER *(specify)*:	(3) CAUSTICS	(3) MILLING/MINE TAILINGS	(3) RADIOACTIVE
(4) ALUMINUM SLUDGE			(4) PESTICIDES	(4) FERROUS SMELTING WASTES	(4) MUNICIPAL
(5) OTHER *(specify)*:			(5) DYES/INKS	(5) NON-FERROUS SMLTG. WASTES	(5) OTHER *(specify)*:
			(6) CYANIDE	(6) OTHER *(specify)*:	
			X (7) PHENOLS		
			(8) HALOGENS		
			(9) PCB		
			(10) METALS		
			(11) OTHER *(specify)*: Phthalates, Amines		

D. LIST SUBSTANCES OF GREATEST CONCERN WHICH ARE ON THE SITE *(place in descending order of hazard)*

1. SUBSTANCE	2. FORM *(mark 'X')* a. SOLID	b. LIQ.	c. VAPOR	3. TOXICITY *(mark 'X')* a. HIGH	b. MED.	c. LOW	d. NONE	4. CAS NUMBER	5. AMOUNT	6. UNIT
Dioctylphthalate		X				X			15000	gal.
Diphenolamine		X			X				UNK	
Dioctylamine		X			X				UNK	
Nonyl & DiNonyl Phenol		X			X				16700	gal.
Acids - Sulfuric		X		X					UNK	
Phosphorus Trichloride		X	X	X					UNK	

VIII. HAZARD DESCRIPTION

FIELD EVALUATION HAZARD DESCRIPTION: Place an 'X' in the box to indicate that the listed hazard exists. Describe the hazard in the space provided.

[X] A. HUMAN HEALTH HAZARDS

From phthalates & phenols in East Drainage Ditch

Continue On Page 5

Continued From Page 4

VIII. HAZARD DESCRIPTION *(continued)*

[X] B. NON-WORKER INJURY/EXPOSURE

See A

[ ] C. WORKER INJURY/EXPOSURE

[ ] D. CONTAMINATION OF WATER SUPPLY

[ ] E. CONTAMINATION OF FOOD CHAIN

[X] F. CONTAMINATION OF GROUND WATER

Phthalates & Phenols & amines in monitoring wells

[X] G. CONTAMINATION OF SURFACE WATER

Phthalates & Phenols & amines seeping into East Drainage Ditch

Continued From Front

VIII. HAZARD DESCRIPTION *(continued)*

[X] H. DAMAGE TO FLORA/FAUNA

Large areas of dead trees on Olin property

[ ] I. FISH KILL

[ ] J. CONTAMINATION OF AIR

[ ] K. NOTICEABLE ODORS

[X] L. CONTAMINATION OF SOIL

Seepage of phthalates, amines & phenols into soil

[ ] M. PROPERTY DAMAGE

Continued From Page 6

VIII. HAZARD DESCRIPTION *(continued)*

☐ N. FIRE OR EXPLOSION

☒ O. SPILLS/LEAKING CONTAINERS/RUNOFF/STANDING LIQUID

Leaking tanks caused the surface water and groundwater contamination

☐ P. SEWER, STORM DRAIN PROBLEMS

☐ Q. EROSION PROBLEMS

☐ R. INADEQUATE SECURITY

☐ S. INCOMPATIBLE WASTES

VIII. HAZARD DESCRIPTION (continued)

☐ T. MIDNIGHT DUMPING

☐ U. OTHER (specify):

IX. POPULATION DIRECTLY AFFECTED BY SITE

A. LOCATION OF POPULATION	B. APPROX. NO. OF PEOPLE AFFECTED	C. APPROX. NO. OF PEOPLE AFFECTED WITHIN UNIT AREA	D. APPROX. NO. OF BUILDINGS AFFECTED	E. DISTANCE TO SITE (specify units)
1. IN RESIDENTIAL AREAS	?	?	Aberjona Riv.	1 Mile
2. IN COMMERCIAL OR INDUSTRIAL AREAS	N/A			
3. IN PUBLICLY TRAVELLED AREAS	N/A			
4. PUBLIC USE AREAS (parks, schools, etc.)	?	?	Aberjona Riv.	1 Mile

X. WATER AND HYDROLOGICAL DATA

A. DEPTH TO GROUNDWATER (specify units)	B. DIRECTION OF FLOW	C. GROUNDWATER USE IN VICINITY
approx. 10	SE	Industrial
D. POTENTIAL YIELD OF AQUIFER	**E. DISTANCE TO DRINKING WATER SUPPLY (specify unit of measure)**	**F. DIRECTION TO DRINKING WATER SUPPLY**
> 3 MGD	5 miles	S

G. TYPE OF DRINKING WATER SUPPLY

☐ 1. NON-COMMUNITY < 15 CONNECTIONS

☒ 2. COMMUNITY (specify town): Woburn > 15 CONNECTIONS

☐ 3. SURFACE WATER

☒ 4. WELL

Continue On Page 9

Continued From Page 8

X. WATER AND HYDROLOGICAL DATA *(continued)*

H. LIST ALL DRINKING WATER WELLS WITHIN A 1/4 MILE RADIUS OF SITE

1. WELL	2. DEPTH *(specify unit)*	3. LOCATION *(proximity to population/buildings)*	4. NON-COMMUNITY *(mark 'X')*	5. COMMUNITY *(mark 'X')*
None				

I. RECEIVING WATER

1. NAME: Aberjona River

☐ 2. SEWERS ☒ 3. STREAMS/RIVERS ☐ 4. LAKES/RESERVOIRS ☐ 5. OTHER *(specify)*:

6. SPECIFY USE AND CLASSIFICATION OF RECEIVING WATERS

Class B Stream being directly contaminated. Water unused

XI. SOIL AND VEGITATION DATA

LOCATION OF SITE IS IN:

☐ A. KNOWN FAULT ZONE ☐ B. KARST ZONE ☐ C. 100 YEAR FLOOD PLAIN ☐ D. WETLAND

☐ E. A REGULATED FLOODWAY ☐ F. CRITICAL HABITAT ☐ G. RECHARGE ZONE OR SOLE SOURCE AQUIFER

XII. TYPE OF GEOLOGICAL MATERIAL OBSERVED

Mark 'X' to indicate the type(s) of geological material observed and specify where necessary, the component parts.

'X'	A. OVERBURDEN	'X'	B. BEDROCK *(specify below)*	'X'	C. OTHER *(specify below)*
X	1. SAND		Bedrock near surface at southern end of site near landfill		
X	2. CLAY				
	3. GRAVEL				

XIII. SOIL PERMEABILITY

☒ A. UNKNOWN ☐ B. VERY HIGH *(100,000 to 1000 cm/sec.)* ☐ C. HIGH *(1000 to 10 cm/sec.)*

☐ D. MODERATE *(10 to .1 cm/sec.)* ☐ E. LOW *(.1 to .001 cm/sec.)* ☐ F. VERY LOW *(.001 to .00001 cm/sec.)*

G. RECHARGE AREA

☐ 1. YES ☒ 2. NO 3. COMMENTS:

H. DISCHARGE AREA

☒ 1. YES ☐ 2. NO 3. COMMENTS:

I. SLOPE

1. ESTIMATE % OF SLOPE: ?

2. SPECIFY DIRECTION OF SLOPE, CONDITION OF SLOPE, ETC.

J. OTHER GEOLOGICAL DATA

Continued From Front

XIV. PERMIT INFORMATION

List all applicable permits held by the site and provide the related information.

A. PERMIT TYPE *(e.g., RCRA, State, NPDES, etc.)*	B. ISSUING AGENCY	C. PERMIT NUMBER	D. DATE ISSUED *(mo., day, & yr.)*	E. EXPIRATION DATE *(mo., day, & yr.)*	F. IN COMPLIANCE *(mark 'X')*		
					1. YES	2. NO	3. UNKNOWN
None							

XV. PAST REGULATORY OR ENFORCEMENT ACTIONS

☒ NONE ☐ YES *(summarize in this space)*

NOTE: Based on the information in Sections III through XV, fill out the Tentative Disposition *(Section II)* information on the first page of this form.

STORAGE FACILITIES SITE INSPECTION REPORT
(Supplemental Report)

INSTRUCTION
Answer and Explain as Necessary.

1. STORAGE AREA HAS CONTINUOUS IMPERVIOUS BASE
[ ] YES [X] NO

2. STORAGE AREA HAS A CONFINEMENT STRUCTURE
[ ] YES [X] NO

3. EVIDENCE OF LEAKAGE/OVERFLOW *(If "Yes", document where and how much runoff is overflowing or leaking from containment)*
[X] YES [ ] NO
Small amount seeping into nearby drainage ditch. Monitoring well grossly contaminated

4. ESTIMATE TYPE AND NUMBER OF BARRELS/CONTAINERS

5. GLASS OR PLASTIC STORAGE CONTAINERS USED
[ ] YES [X] NO

6. ESTIMATE NUMBER AND CAPACITY OF STORAGE TANKS
10 tanks, 6 in one group, 4 in another (5000 to 15000 gallon capacity)

7. NOTE LABELING ON CONTAINERS
None

8. EVIDENCE OF LEAKAGE CORROSION OR BULGING OF BARRELS/CONTAINERS/STORAGE TANKS *(If "Yes", document evidence. Describe location and extent of damage. Take PHOTOGRAPHS)*
[ ] YES [X] NO

9. DIRECT VENTING OF STORAGE TANKS
[ ] YES [X] NO

10. CONTAINERS HOLDING INCOMPATIBLE SUBSTANCES *(If "Yes", document evidence. Describe location and identity of hazardous waste. Take PHOTOGRAPHS.)*
[ ] YES [X] NO

11. INCOMPATIBLE SUBSTANCES STORED IN CLOSE PROXIMITY *(If "Yes", document evidence. Describe location and identity of hazardous waste. Take PHOTOGRAPHS.)*
[ ] YES [X] NO

12. ADEQUATE CONTAINER WASHING AND REUSE PRACTICES
[ ] YES [ ] NO UNK

13. ADEQUATE PRACTICES FOR DISPOSAL OF EMPTY STORAGE CONTAINERS
[ ] YES [ ] NO N/A

STEPAN
National Polychemicals Division
Eames St., Wilmington, Massachusetts 01887

July 18, 1973.

RECEIVED

JUL 26 1973

MASS. DIVISION OF
WATER POLLUTION CONTROL

Mr. Thomas C. McMahon, Director
The Commonwealth of Massachusetts
Water Resources Commission
Leverett Saltonstall Building
Government Center
100 Cambridge Street
Boston, Massachusetts 02202.

Dear Mr. McMahon:

The following is an item by item response to your letter of July 13, 1973.

(1) The large volume of "industrial sludge" is pure calcium sulfate (gypsum) which had been lifted out of the secondary clarifier. This material has no odor and has not been eroded since being placed in its present position. It became necessary to remove this material from the pond because overflow conditions were being reached as the pond had filled at a much faster rate than had been anticipated due to a lower rate of compaction as the solids level increased. I am sure that your Division is aware of the fact that Dana Perkins has been engaged to engineer a second secondary clarifying pond and also a sanitary landfill for the gypsum on our property adjacent to the Woburn City dump. The engineering work on both of these projects has been progressing and Mr. Tarbell of Public Health and Mr. Romano, Wilmington Health Officer, have made a preliminary inspection of the proposed landfill area and of the secondary clarifier. It was pointed out at this time that erosion had not taken place even with very heavy rains. The general plans as developed by our consultant, Dana Perkins, entail the use of two secondary clarifier ponds with one area cleaned each year by removal of the gypsum to the approved landfill area. These plans will be submitted to your Division for review as soon as preliminary approval is obtained from Public Health.

(2) The PVC liner in the lagoon has not been broken in two places. I can only assume that this comment refers to several channels from the lagoon that were created by the pond overflowing for a short period before the calcium sulfate was removed.

(3) The wells referred to were experimental borings, placed under pumping tests by the D. L. Maher Company of North Reading. We were assured by Mr. Maher that he had the right to conduct flow tests on these wells without obtaining permits. This flow was discontinued on February 5, 1973 and will not be restarted.

(4) The oil drums that receive the flow from the skimmer have been removed, the area cleaned and tight housekeeping will be maintained in the future.

telephone: (617) 933-4240 cable: NAPOL

STEPAN National Polychemicals Division
Wilmington, Massachusetts 01887

The oil seepage which was directed to our attention by your inspectors was at the railroad ditch level about 10 - 15 feet below grade and behind our chemical storage tank farm. All tanks and lines were examined and found to be free from leakage. The soil behind the tankfarm at grade level is sandy and clean with no indications of chemical runoff. Our water pollution consultants from the Badger Corporation examined this site and have theorized that the seepage could be due to natural occuring hydrocarbons being leached from the soil at the extremely high water table that was experienced in May of this year.

We have recently examined the railroad ditch under the prevaling conditions of a much lower water table and there are now only very slight traces of oil films in the ditch. I am sure that your Division is aware that this ditch is loaded with raw sewerage emanating from above our plant site and that the bottom of the ditch exhibits concentrations of black sludge which appears to be raw sewerage derived.

At the present time, we are cooperating very closely with the Town of Wilmington, the MDC, and Public Health to eliminate all of our problem areas through approved long-term solutions. The Badger Corporation are consulting with us on the mechanics of the treatment plant with particular concentration in the area of finding more efficient sump pumps to handle our effluent streams. We have attempted to cooperate fully with your Division as evidenced by our conducting engineering personnel from other companies through our facility at Mr. Bonne's request and offering our engineering designs free of charge. However, on the inspection level, we feel that cooperation has been less than desirable. During the last inspection, your people refused my invitation to enter the office building and discuss with me their findings. They indicated to the plant people that they were "too busy" to do this. On another occasion one of your inspectors drove an automobile directly into our plant and through several hazardous operating areas to the treatment plant. I am sure that you are aware under the OSHA regulations that we are responsible for the safety of all persons who enter our plant areas and that all visitors must be equipped with the proper safety equipment at the front office.

The key personnel in this Division are ready to discuss our entire program and the individual points raised in your letter of July 13 at any time convenient to your personnel.

Very truly yours,

NATIONAL POLYCHEMICALS
A Division of Stepan Chemical Company

Charles P. Riley Jr

Charles P. Riley, Jr.
General Manager

CPR/jlp

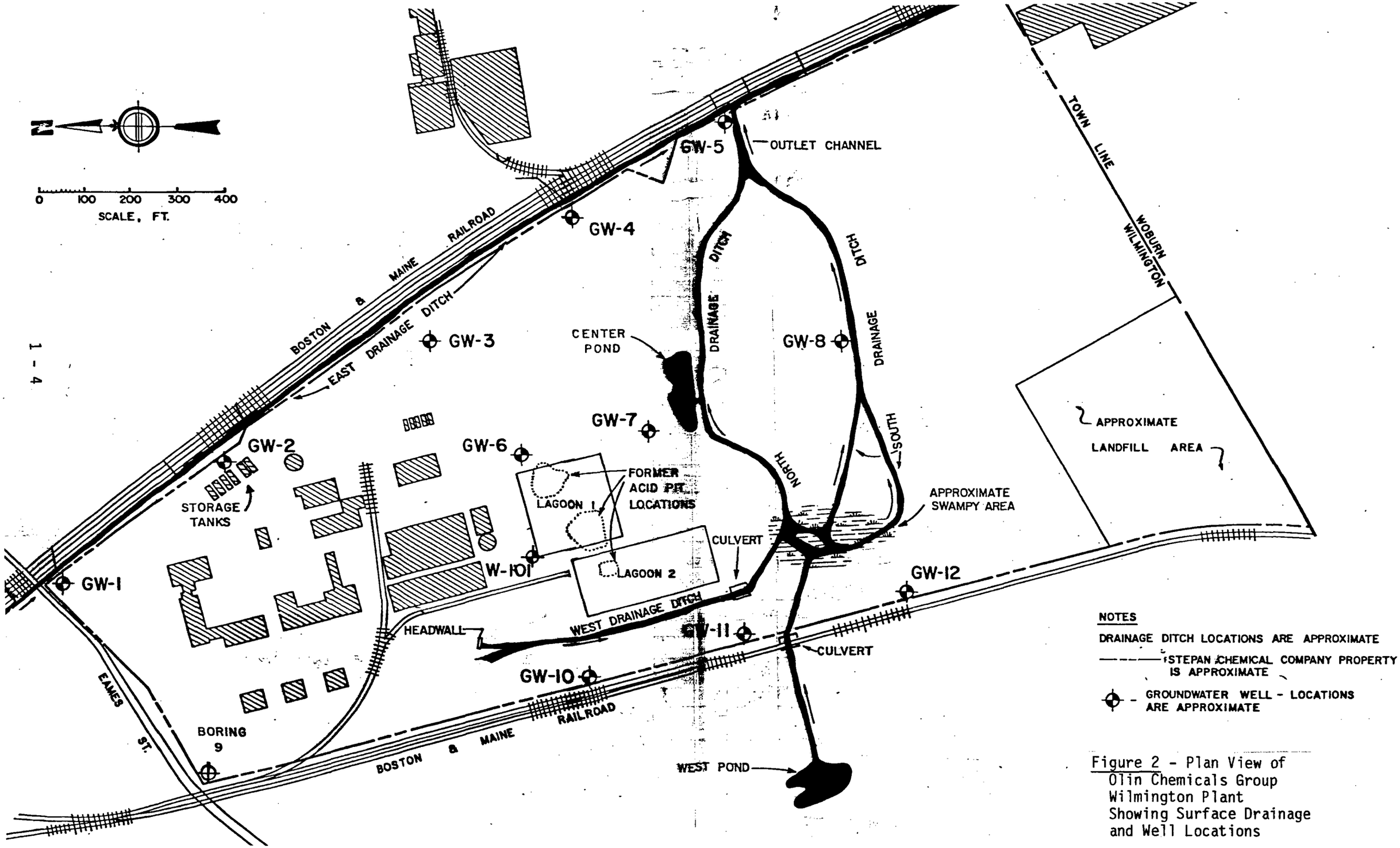
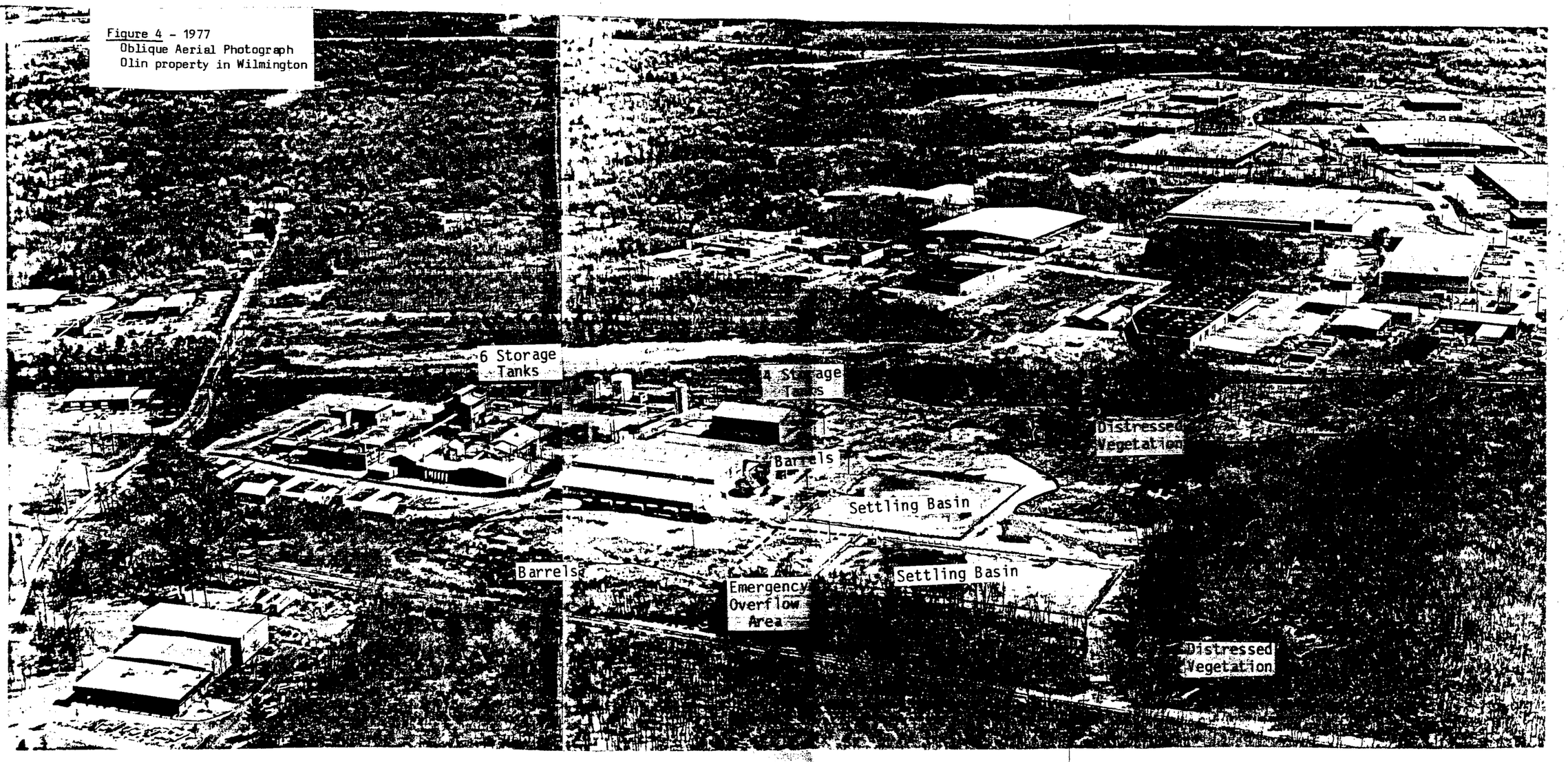


Figure 2 - Plan View of Olin Chemicals Group Wilmington Plant Showing Surface Drainage and Well Locations

Figure 4 - 1977
Oblique Aerial Photograph
Olin property in Wilmington



FILE IN SECTION TWO OF FIT **MASTER FILE**

INTERNAL DISTRIBUTION LIST - REGIONS

Date: 10/20/80

Doc. No. EFSR 8010-0101 Key Word 2 CHEMICALS Key Word 4 ASSESSMENT
Key Word 1 OLIN Key Word 3 WILMINGTON Author D COOK

TYPE OF DOCUMENT (CHECK)

E & E		FCH
Tech. Dir. Doc. (EFTD)	Contr.TelCon or TWX (ECTT)	Tech.Dir.Doc. (FFTD)
Ack. of Comp TDD (EFAC)	Intern.Contr.Corresp.(EFIC)	Ack.of Comp TDD(FFAC)
Contractor Pref.Eval.(EFPE)	Meetings w/EPA (EFCM)	Contractor Pref.Eval(
Contr. Letters from EPA(CEPA)	X Site Reports (EFSR)	Other Contr.Corres.(F
Contr. Letters to EPA (EFCL)	Equipment/Vans (EFEV)	
(Inclu.Month Activity/Fin.Report)	Other Contr. Corres. (EFOC)	
Contr. Letters to Sub. (EFLS)		FCH Progress Rpts. (F

Check (X) for distribution or place date before name of person from whom you want action response. NOTE: ALL COMMITMENT RESPONSE TO THE CUSTOMER MUST BE SUBMITTED THROUGH THE NPMO CONTRACTS MANAGER IN WASHINGTON, D.C.

FIT National Program Office (NPMO) - Washington, D.C.		EPA - Washington, D.
R. Gray-Nat. Proj. Mgr.	X FIT Master File	FIT Program Mgr.
L. Weitzel-Asst. for Tech. Perf.	J. Schultz-Info.	FIT Contracting Off
R. King-Asst. for Training & Safety	J. Lukin-Coordinate	
C. Lockwood-Admin/Contracts		

FIT REGIONS

	EPA DPC	E&E FCH	EPA DPC	E&E FCH
or by Regions(s)		All Regions		Region 6 (Dallas)
by title of	X	Region 1 (Boston)		Region 7 (Kansas City)
ividual(s) you		Region 2 (Edison)***		Region 8 (Denver)***
to receive		Region 2 FCH (Newark)		Region 8 FCH (Denver)
tribution (see		Region 3 (Phila.)		NEIC FCH (Denver)
Region		Region 4 (Atlanta)***		Region 9 (San Fran)
sonnel)		Region 5 (Chicago)***		Region 10 (Seattle)
				NEIC

FIT Region Personnel

FITL	Safety/Health Officer	Training Officer
AC ***	Equipment Officer	

TRIBUTION BY: Carol Ann Kirk DATE: 10/23/80

MASTER FILE

Date: 10/23/80

TDD # F1-8005-01F

PRELIMINARY SITE ASSESSMENT

of

OLIN CHEMICALS GROUP PLANT

Eames Street
Wilmington, Massachusetts

Submitted to:
Merrill S. Hohman, Director
Air and Hazardous Materials Division
U.S. EPA, Region I

Submitted by:
David Cook, Project Leader
Ecology and Environment, Inc. (E & E)
FIT Team, Region I

Date Submitted:
October 24, 1980

MASTER FILE

Date: 10/23/80

PRELIMINARY SITE ASSESSMENT

FOR

OLIN CHEMICAL GROUP
WILMINGTON PLANT

TDD #:	F1-8005-01F
Firm Name:	Olin Chemicals Group
Address:	Eames Street Wilmington, Massachusetts
Telephone:	203-356-3156
Owner:	Corporation
Principal Contact at Site:	Mr. David Vaughn (Hartford Office)

MASTER FILE

Date: 10/23/80

1. Purpose of Assessment:

To gather preliminary data and assess the need for site entry and sampling of Olin Chemical Group's Wilmington Plant. Data will be used to determine potential for possible RCRA and/or 311/104 Clean Water Act actions against Olin Chemical Group.

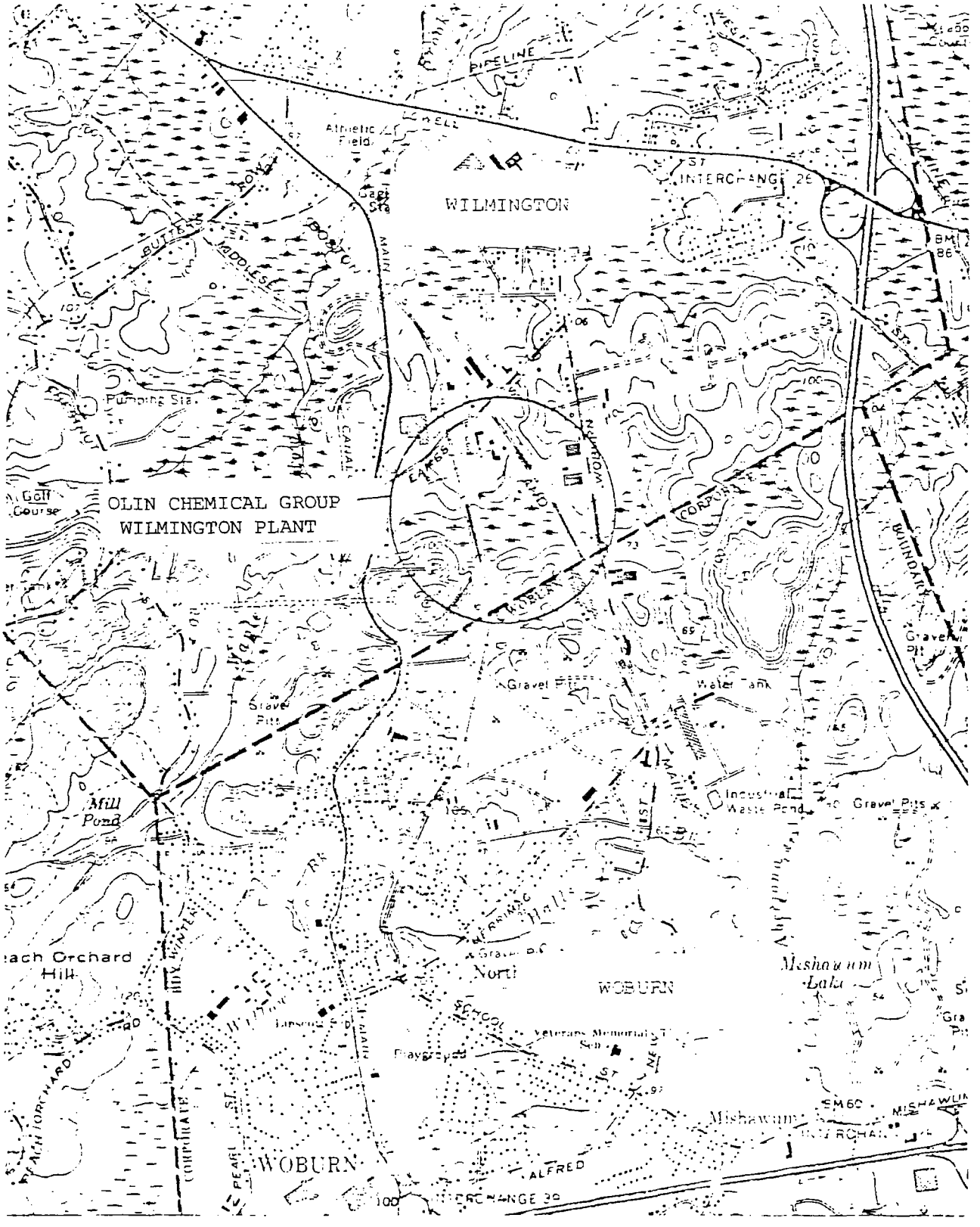
2. Objective:

To conduct an off-site investigation of the Wilmington Plant site in order to locate evidence of contamination, identify possible contaminants and determine sampling point locations for future on-site activities.

3. Background:

3.1 Description:

The Olin Chemicals Group Wilmington Plant occupies a 53-acre site south of Eames Street in Wilmington, Massachusetts. The site is bounded on the east by the Boston and Maine railroad tracks, on the south by the Woburn-Wilmington town line, on the west by a Boston and Maine railroad spur, and on the north by Eames Street (See Figures 1 and 2). The property was purchased by Olin Chemicals Group in September, 1980 from the Stepan Chemical Company which had occupied the site since 1971. Chemical plant operations on this site began in 1953 under the ownership of National Polychemicals, Inc. which merged with Stepan Chemical Company in 1971. The northern one-half of the site is occupied by the production facilities, and the southern one-half is wooded. A drainage ditch parallel to the Boston and Maine tracks borders the east line and carries water from north to south along the project site boundary. This drainage ditch continues adjacent to the tracks until its confluence with Hall's Brook about 0.9 miles south of the site. Nearly all surface water on the site is routed to a single channel which flows into the drainage ditch, as shown in Figure 2.



From USGS Quadrangle Map - Wilmington Quadrangle.

Scale: 1" = 2000'

Figure 1 - Location Map of
Olin Chemicals Group
Wilmington Plant.

3. Background:

3.1 Description -continued

At the time when the aerial photograph presented in Figure 3 was taken (April 24, 1971), three acid pits existed to the south of the processing facilities. These pits have been replaced by rectangular settling basins as shown in Figure 4 (photographed on April 29, 1977). An extensive area of distressed vegetation is present in the east-central portion of the property. Also on the property are eleven large storage tanks noted in Figure 4. there are twelve wells on the property as noted in Figure 2.

3.2 Primary Site Activity:

Several chemicals have been synthesized on-site from a variety of ingredients. The processes used and the final products are as follows (quantities based on 1973 production figures):

Opex Process - Dinitropentamethylenetetramine (DNPT), a slightly water soluble solid used as a blowing agent in the production of expanded rubber compounds, 1.2 million pounds per year.

Kempore Process - Azodicarbonamide (Kempore), also a slightly water soluble solid used as a rubber blowing agent, 1.6 to 1.8 million pounds per year.

Wytox Process - Wytox, a liquid phosphite rubber stabilizer, one million pounds per year.

Wytox ADP-X Process - Dioctyldiphenylamine (DODPA), a dark colored resinous solid, 600,000 pounds per year.

O.B.S.H. Process - Oxybisbenzenesulfonylhydrazide (OBSH), a rubber blowing agent, 300,000 pounds per year.

3. Background:

3.2 Primary Site Activity - continued

Raw materials and waste products for the preceeding processes are listed in Table 1. Only those waste products discharged into the yard or floor drainage system are listed. The drainage system is shown in Figure 5.

In addition to the above processes, numerous coatings for rubber products were produced on site. The following chemicals were used to produce the coatings:

Bentone
Santocel
Ufamite MM 67
Toluene
Butylacetate
Acrylic Resins
Maleic Anhydride
Gylcerine
Fatty Amines
Silicone
Monoethanolamine
Mineral Oil

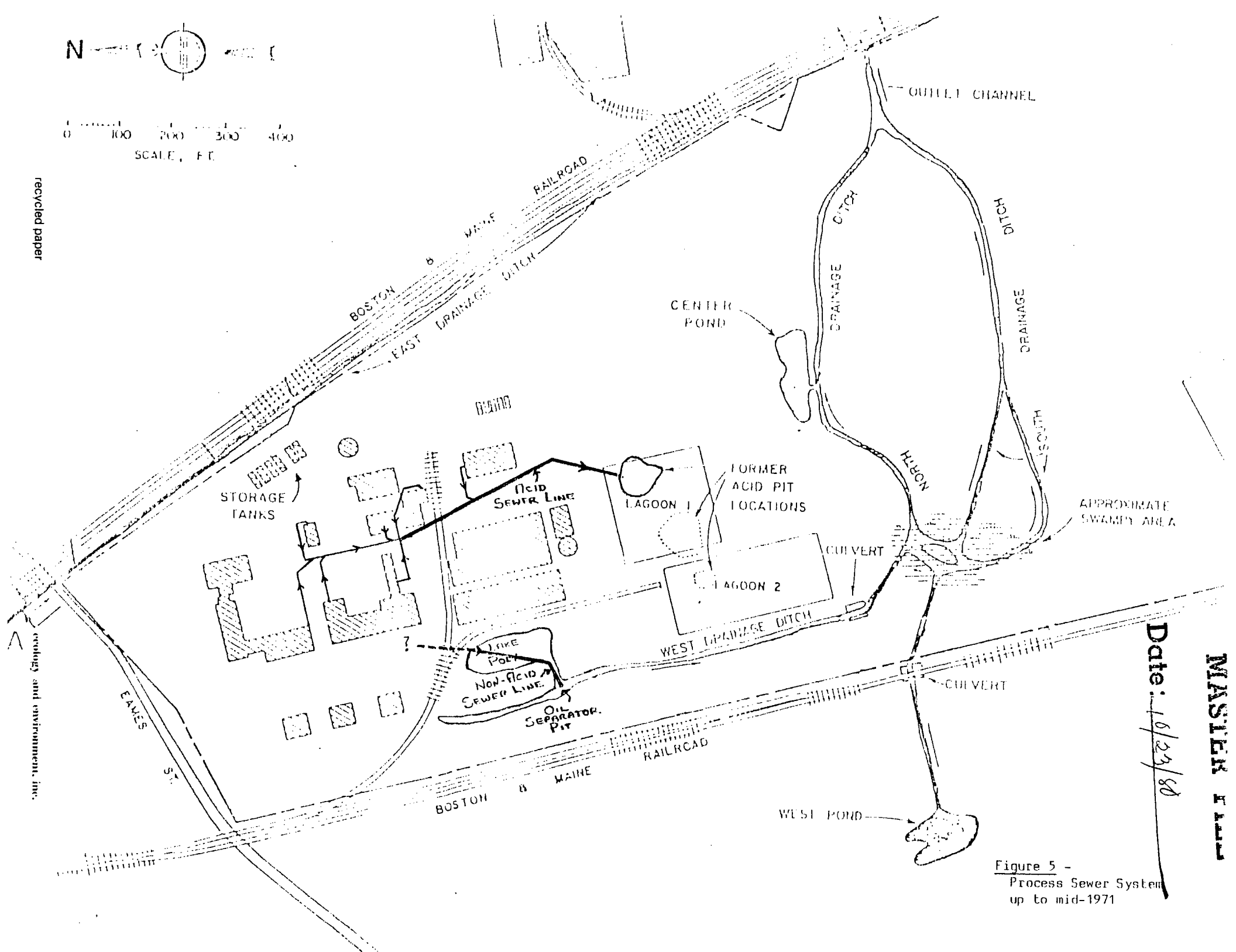


Figure 5 -
Process Sewer System
up to mid-1971

Date: 6/23/80

MASTER FILE

recycled paper

ecology and environment, inc.

3. Background:

3.2 Primary Site Activity - continued

TABLE 1 - Raw Materials and Waste Products Associated With Chemical Processes Used by National Polychemicals, Inc. and Stepan Chemical Company between 1953 and 1978.

Process	Raw Materials	Waste Products
Opex	anhydrous ammonia	sodium chloride
	formaldehyde	formaldehyde
	sodium nitrite	sodium nitrite
	hydrochloric acid	process oil
Kempore	liquid chlorine	sodium sulfate
	urea	sodium chloride
	sodium hydroxide	ammonium sulfate
	sulfuric acid	urea
	hydrazine	sulfuric acid
Wytox	phosphorous trichloride	None sewered
	paraformaldehyde	
	nonyl phenol	
Wytox ADP-X	diphenylamine	diisobutylene
	diisobutylene	aluminum hydroxide
	aluminum chloride	sodium chloride
O.B.S.H.	diphenyloxide	sulfuric acid
	chlorosulfonic acid	

Date: 10/23/80

3. Background:

3.2 Primary Site Activity - continued

According to MDC records, the following materials were being stored on-site as of June 30, 1980:

MATERIAL BEING STORED:	Annual Thruput (gals.)	Type of Storage Container (tank, drum, etc.)	Size of Container (gals.)
1. Formaldehyde	172,500	Tank	13,300
2. Nonyl phenol	281,600	Tank	10,000
3. Dinonyl phenol	30,500	Tank	6,700
4. Ethyl hexoic acid	18,400	Tank	5,000
5. Dioctylphthlate	54,200	Tank	15,000
6. Process Oil	11,800	Tank	4,250
7. TNPP (Wytox 312)	50,000	Tank	10,000

Chemicals used or manufactured at this site are transported in 55-gallon drums by railcar.

3.3 Secondary site activity:

Not applicable

Date: 10/23/80

3. Background:

3.4 Hazards Identified or Alleged:

Potential sources of contamination as a result of on-site activities past or present are the following:

1. Leaking of materials from storage tanks.

2. Leaching of materials from acid pits.

3. Leaching of materials from burial sites.

4. Exfiltration from sewers.

A close examination of the chemicals which have been used on-site indicates that only a small number may have contributed or are contributing to an environmental hazard. Toluene and dioctylphthalate are included in the Federal Register list of priority pollutants. It is highly likely that toluene would have volitalized soon after a spill. Dioctylphthalate is very persistant and has been associated with pneumonia-like symptoms. Several other chemicals used on site including hydrazine, nonylphenol, dinonylphenol, and ethyl hexoic acid may cause undesirable symptoms. The extensive vegetative stress noted on-site is probably the result of high sodium chloride and sulfuric acid concentrations leaching from the former acid pits.

Prior to 1971, all waste materials were disposed of on-site either into a series of three acid pits or directly into a series of channels on the property. Eventually, all material either leached or drained into the ditch paralleling the Boston and Maine railroad tracks and proceeded ultimately to the Aberjona River. In 1971, disposal of wastes was changed to the system presently in use. Sulfate bearing wastes are mixed with a calcium hydroxide slurry to form a calcium sulfate sludge which is disposed of in two polyvinyl chloride (PVC)-lined lagoons. An analysis of this sludge is as follows (analyzed by National Polychemicals, Inc., September 1970):

3. Background:

3.4 Hazards Identified or Alleged - continued

Water	27,500 lbs.
Gypsum	26,800 lbs.
$CaCO_3$	650 lbs.
Calcium Oxbisbenzene Sulfonate	Trace
Na_2SO_4	Trace
Al $(OH)_3$	Trace
NaCl	Trace
$CaCl_2$	Trace
Formaldehyde	Trace
$NaNO_2$	Trace
NH_4Cl	Trace
TOTAL	54,950 lbs. = 27.5 Tons/Day

A study performed in 1979 by Geotechnical Engineers, Inc. of Winchester, Massachusetts, indicated that several holes exist in the PVC liner (See Figures 6 to 8). It was also discovered that sludge has been dumped in an emergency lagoon when the two existing lagoons filled to capacity (See Figure 4). This emergency lagoon had no liner and was formed by dredging soil to form a roughly rectangular area. Solids from the lagoons are dredged periodically and landfilled on the southwest corner of the property. The landfill site was approved by the State Department of Environmental Quality Engineering (DEQE). The analysis of the sludge indicates that no environmental hazards would result from leaching of the lagooned or landfilled materials into the ground.

Non-sulfate bearing wastes generated on-site are presently discharged into an underground sewer line which connects to a Town of Wilmington owned sewer. This line connects to a Metropolitan District Commission (MDC) sewer line. Complaints regarding high chloride, sulfate and ammonia levels in the sewer effluent have been made on several occasions.

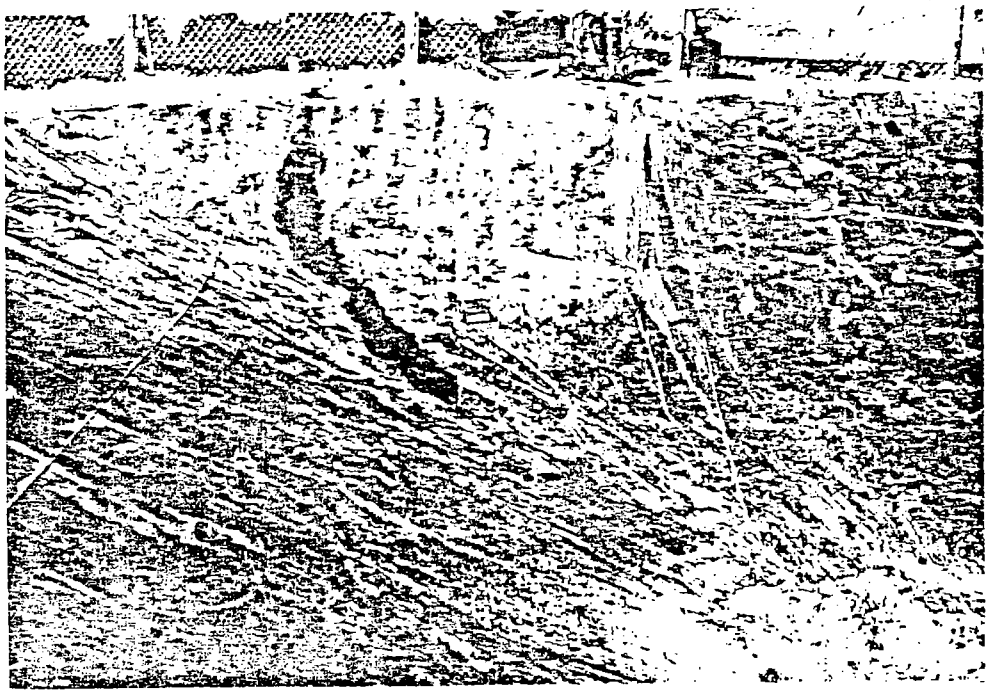


Figure 6 - Leak Along the Seam of the Polyvinyl Chloride Liner in the Sulfate Sludge Lagoon.

Figure 7 - Enlargement from Figure 6.

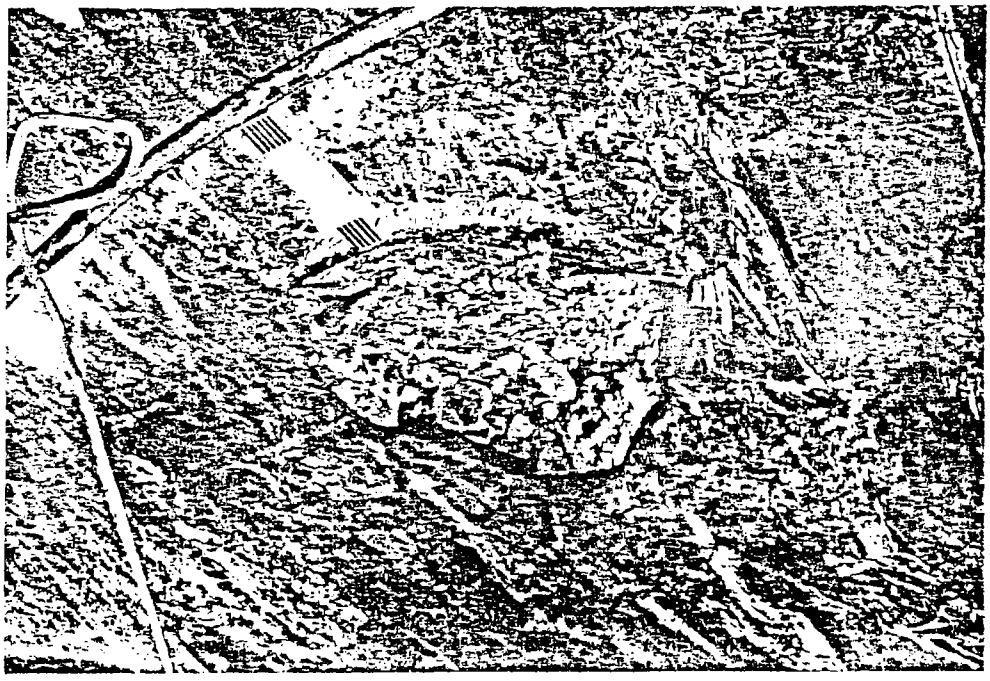


Figure 8 - Hole in the Polyvinyl Chloride Liner Associated with the Sulfate Sludge Lagoon.

3. Background:

3.4 Hazards Identified or Alleged - continued

An unofficial report from a former Stepan employee indicates that phosphorus trichloride was often dumped directly into the ground and that residues were buried next to the wetlands near the drainage channel. Sediment and ground water samples must be taken to confirm or deny the existence of an environmental hazard resulting from such alleged activities.

A 1977 aerial photograph shows two areas where drums were stored on-site (See Figure 4). Leaks in these drums may have resulted in ground water contamination. The 1971 photo (Figure 3) also reveals a spill generating from the group of six large storage tanks on the east side of the property. Since 1973, "black ooze" has been noted seeping into the drainage ditch paralleling the railroad tracks east of the site (Figure 9). A sample was taken by the E & E, FIT team on october 2, 1980, (See memo to John Hackler from David Cook dated October 6, 1980), and the analysis should be available by the end of October.

The drainage ditch mentioned above has been the object of sampling and analysis on several occasions. On January 23, 1980, five samples were collected by the EPA and subsequently analyzed for purgeable organics. The results indicated the following:

1. Moderate to high levels of 1,1 - dichloroethane, 1,1,1 - trichloroethane, trichloroethylene, toluene and xylene are present upstream of Stepan/Olin.

2. Moderate to high levels of 1,1,2 - dichloroethylene and 1,1,2 - trichloroethane in addition to the five chemicals listed under (1) are present downstream of Stepan/Olin.

3. Therefore, some chlorinated hydrocarbons may be leaching from Stepan/Olin into the drainage ditch.

3. Background:

3.4 Hazards Identified or Alleged - continued

4. Analyses of the outfalls from Stepan/OLin do not indicate significant off-site migration of contamination.

Priority pollutant samples were taken from the drainage ditch paralleling the railroad tracks on July 28, 1980. Samples taken upstream and downstream of the Stepan/Olin property indicated small amounts of purgeables generating from the site.

In summary, existing data do not support that this site is a major contributor to surface water contamination. Information contrary to this may be provided by the in-progress analysis of the "black ooze" mentioned earlier in this report and by the sampling and analysis plan recommended in Section 4 of this report. Information necessary to evaluate potential groundwater contamination is not available.

4. Recommendations:

It is highly recommended that sampling and analysis of existing wells (See Figure 2) surface water and soil be performed as outlined in the following sampling plan. The selection of well sampling points was based on groundwater data contained in the Geotechnical Engineers, Inc. report entitled Groundwater and Surface Water Study - Stepan Chemical Company, Wilmington, Massachusetts (December 6, 1978). The sampling plan should include:

1. Sampling and analysis of the following wells:

GW-2
GW-3
GW-4
GW-5
GW-7
GW-10
W-101

Figure 9 - Sheen resulting from "black ooze" seeping into the Drainage Ditch.

4. Recommendations - continued

Well GW-5 has been selected for priority pollutant analysis. Well GW-10 should be sampled for background. All other wells should be sampled for volatile organics, chlorinated hydrocarbons, dioctylphthalate and nonyl and dinonyl phenol. Samples should be obtained with a bailer after at least one static volume of each well is discharged. Samples should be screened using the Century OVA.

2. A surface water sample should be taken at the outlet of the on-site drainage channel and submitted for priority pollutant analysis. Additional appropriate surface water samples should be selected during the on-site inspection. These samples should be screened for volatile organics and chlorinated hydrocarbons.

3. Soil samples should be taken near the group of six large storage tanks on the east side of the site. Samples should also be taken of the existing settling basins where the acid pits were located and of the sulfate sludge landfill.

4. A sediment sample should be taken from Center Pond (See Figure 2).

The sampling plan outlined above should indicate which of the contaminants present in the drainage ditch originate from the Olin Property.

MASTER FILE

POTENTIAL HAZARDOUS WASTE SITE
IDENTIFICATION AND PRELIMINARY ASSESSMENT

Date

REGION	SITE NUMBER (to be assigned by Hq)
I	10/23/80

NOTE: This form is completed for each potential hazardous waste site to help set priorities for site inspection. The information submitted on this form is based on available records and may be updated on subsequent forms as a result of additional inquiries and on-site inspections.

GENERAL INSTRUCTIONS: Complete Sections I and III through X as completely as possible before Section II *(Preliminary Assessment)*. File this form in the Regional Hazardous Waste Log File and submit a copy to: U.S. Environmental Protection Agency; Site Tracking System; Hazardous Waste Enforcement Task Force *(EN-335)*; 401 M St., SW; Washington, DC 20460.

I. SITE IDENTIFICATION

A. SITE NAME	B. STREET (or other identifier)		
Olin Chemicals Group Wilmington Plant	Eames Street		
C. CITY	**D. STATE**	**E. ZIP CODE**	**F. COUNTY NAME**
Wilmington	MA	01887	Middlesex

G. OWNER/OPERATOR *(if known)*

1. NAME	2. TELEPHONE NUMBER
Mr. McBrien (Plant Manager)	356-3156

H. TYPE OF OWNERSHIP

☐ 1. FEDERAL ☐ 2. STATE ☐ 3. COUNTY ☐ 4. MUNICIPAL ☒ 5. PRIVATE ☐ 6. UNKNOWN

I. SITE DESCRIPTION

Chemical plant with approx. 20 buildings and a large wooded area

J. HOW IDENTIFIED *(i.e., citizen's complaints, OSHA citations, etc.)*	K. DATE IDENTIFIED *(mo., day, & yr.)*
TDD# F-1-8006-01 (EPA)	6/25/80

L. PRINCIPAL STATE CONTACT

1. NAME	2. TELEPHONE NUMBER
Dick Slein	935-2160

II. PRELIMINARY ASSESSMENT *(complete this section last)*

A. APPARENT SERIOUSNESS OF PROBLEM

☐ 1. HIGH ☒ 2. MEDIUM ☐ 3. LOW ☐ 4. NONE ☐ 5. UNKNOWN

B. RECOMMENDATION

☐ 1. NO ACTION NEEDED *(no hazard)*

☐ 2. IMMEDIATE SITE INSPECTION NEEDED
a. TENTATIVELY SCHEDULED FOR: _____
b. WILL BE PERFORMED BY: _____

☒ 3. SITE INSPECTION NEEDED
a. TENTATIVELY SCHEDULED FOR: week of Nov. 10, 9180
b. WILL BE PERFORMED BY: E&E FIT Team

☐ 4. SITE INSPECTION NEEDED *(low priority)*

C. PREPARER INFORMATION

1. NAME	2. TELEPHONE NUMBER	3. DATE (mo., day, & yr.)
David K. Cook	935-4008	10/23/80

III. SITE INFORMATION

A. SITE STATUS

☒ 1. ACTIVE *(Those industrial or municipal sites which are being used for waste treatment, storage, or disposal on a continuing basis, even if infrequently.)*

☐ 2. INACTIVE *(Those sites which no longer receive wastes.)*

☐ 3. OTHER *(specify):* _____ *(Those sites that include such incidents like "midnight dumping" where no regular or continuing use of the site for waste disposal has occurred.)*

B. IS GENERATOR ON SITE?

☐ 1. NO ☒ 2. YES *(specify generator's four-digit SIC Code):* _____

C. AREA OF SITE *(in acres)*	D. IF APPARENT SERIOUSNESS OF SITE IS HIGH, SPECIFY COORDINATES	
	1. LATITUDE *(deg.-min.-sec.)*	2. LONGITUDE *(deg.-min.-sec.)*
53		

E. ARE THERE BUILDINGS ON THE SITE?

☐ 1. NO ☒ 2. YES *(specify):* Many plant buildings

MASTER FILE

Date: 10/23/80

IV. CHARACTERIZATION OF SITE ACTIVITY

Indicate the major site activity(ies) and details relating to each activity by marking 'X' in the appropriate boxes.

A. TRANSPORTER	B. STORER	C. TREATER	D. DISPOSER
1. RAIL	1. PILE	1. FILTRATION	X 1. LANDFILL
2. SHIP	2. SURFACE IMPOUNDMENT	2. INCINERATION	2. LANDFARM
3. BARGE	X 3. DRUMS	3. VOLUME REDUCTION	3. OPEN DUMP
4. TRUCK	X 4. TANK, ABOVE GROUND	4. RECYCLING/RECOVERY	X 4. SURFACE IMPOUNDMENT
5. PIPELINE	5. TANK, BELOW GROUND	X 5. CHEM./PHYS. TREATMENT	5. MIDNIGHT DUMPING
6. OTHER (specify):	6. OTHER (specify):	6. BIOLOGICAL TREATMENT	6. INCINERATION
		7. WASTE OIL REPROCESSING	7. UNDERGROUND INJECTION
		8. SOLVENT RECOVERY	X 8. OTHER (specify): Burial
		9. OTHER (specify):	

E. SPECIFY DETAILS OF SITE ACTIVITIES AS NEEDED

Rubber blowing agents synthesized on-site. Waste historically dumped in acid pits or into surface water.

V. WASTE RELATED INFORMATION

A. WASTE TYPE

☐ 1. UNKNOWN ☒ 2. LIQUID ☐ 3. SOLID ☒ 4. SLUDGE ☐ 5. GAS

B. WASTE CHARACTERISTICS

☐ 1. UNKNOWN ☐ 2. CORROSIVE ☐ 3. IGNITABLE ☐ 4. RADIOACTIVE ☐ 5. HIGHLY VOLATILE
☐ 6. TOXIC ☐ 7. REACTIVE ☒ 8. INERT ☐ 9. FLAMMABLE

☐ 10. OTHER (specify): _____

C. WASTE CATEGORIES

1. Are records of wastes available? Specify items such as manifests, inventories, etc. below.

Process operation records identify type of waste

2. Estimate the amount (specify unit of measure) of waste by category; mark 'X' to indicate which wastes are present.

a. SLUDGE	b. OIL	c. SOLVENTS	d. CHEMICALS	e. SOLIDS	f. OTHER
AMOUNT: ?	AMOUNT: ?	AMOUNT: Minor	AMOUNT: Major	AMOUNT:	AMOUNT:
UNIT OF MEASURE:	UNIT OF MEASURE:	UNIT OF MEASURE:	UNIT OF MEASURE:	UNIT OF MEASURE:	UNIT OF MEASURE:
X (1) PAINT, PIGMENTS	X (1) OILY WASTES	(1) HALOGENATED SOLVENTS	X (1) ACIDS	X (1) FLYASH	X (1) LABORATORY PHARMACEUT.
(2) METALS SLUDGES	(2) OTHER (specify):	X (2) NON-HALOGNTD. SOLVENTS	(2) PICKLING LIQUORS	(2) ASBESTOS	(2) HOSPITAL
(3) POTW		(3) OTHER (specify):	(3) CAUSTICS	(3) MILLING/ MINE TAILINGS	(3) RADIOACTIVE
(4) ALUMINUM SLUDGE			(4) PESTICIDES	(4) FERROUS SMLTG. WASTES	(4) MUNICIPAL
X (5) OTHER (specify): Sulfate sludge			(5) DYES/INKS	(5) NON-FERROUS SMLTG. WASTES	(5) OTHER (specify):
			(6) CYANIDE	(6) OTHER (specify):	
			(7) PHENOLS		
			(8) HALOGENS		
			(9) PCB		
			(10) METALS		
			(11) OTHER (specify)		

Continue On Page 3

Continued From Page 2

V. WASTE RELATED INFORMATION (continued)

3. LIST SUBSTANCES OF GREATEST CONCERN WHICH MAY BE ON THE SITE (place in descending order of hazard).

Dioctylphthalate
Nonyl & Dinonyl Phenol
Volatile Organics
Hydrazine

MASTER FILE

Date: 10/23/80

4. ADDITIONAL COMMENTS OR NARRATIVE DESCRIPTION OF SITUATION KNOWN OR REPORTED TO EXIST AT THE SITE.

Phosphorus trichloride allegedly dumped in swamp. Burial of unknown residues in swamp.

VI. HAZARD DESCRIPTION

A. TYPE OF HAZARD	B. POTENTIAL HAZARD (mark 'X')	C. ALLEGED INCIDENT (mark 'X')	D. DATE OF INCIDENT (mo., day, yr.)	E. REMARKS
1. NO HAZARD				
2. HUMAN HEALTH	X			
3. NON-WORKER INJURY/EXPOSURE	X			from drainage ditch
4. WORKER INJURY		X		ammonia fumes
5. CONTAMINATION OF WATER SUPPLY				
6. CONTAMINATION OF FOOD CHAIN				
7. CONTAMINATION OF GROUND WATER	x			very likely
8. CONTAMINATION OF SURFACE WATER		x		Analytical data available
9. DAMAGE TO FLORA/FAUNA		x		Large area of dead trees
10. FISH KILL				
11. CONTAMINATION OF AIR		x		Ammonia fumes Phosphorus trichloride
12. NOTICEABLE ODORS		x		Ammonia fumes Phosphorus trichloride
13. CONTAMINATION OF SOIL		x		Leak from storage tanks, alleged burial of residues
14. PROPERTY DAMAGE				
15. FIRE OR EXPLOSION				
16. SPILLS/LEAKING CONTAINERS/ RUNOFF/STANDING LIQUIDS		x		
17. SEWER, STORM DRAIN PROBLEMS		x		Ammonia & sulfate
18. EROSION PROBLEMS				
19. INADEQUATE SECURITY				
20. INCOMPATIBLE WASTES				
21. MIDNIGHT DUMPING				
22. OTHER (specify):				

Continued From Front

VII. PERMIT INFORMATION

A. INDICATE ALL APPLICABLE PERMITS HELD BY THE SITE.

☐ 1. NPDES PERMIT ☐ 2. SPCC PLAN ☐ 3. STATE PERMIT *(specify)*: _____

☐ 4. AIR PERMITS ☐ 5. LOCAL PERMIT ☐ 6. RCRA TRANSPORTER

☐ 7. RCRA STORER ☐ 8. RCRA TREATER ☐ 9. RCRA DISPOSER

☐ 10. OTHER *(specify)*: _____

B. IN COMPLIANCE?

☐ 1. YES ☐ 2. NO ☐ 3. UNKNOWN

4. WITH RESPECT TO *(list regulation name & number)*: _____

VIII. PAST REGULATORY ACTIONS

☐ A. NONE ☒ B. YES *(summarize below)*

Sewer problem - ammonia & sulfates

IX. INSPECTION ACTIVITY *(past or on-going)*

☐ A. NONE ☒ B. YES *(complete items 1,2,3, & 4 below)*

1. TYPE OF ACTIVITY	2. DATE OF PAST ACTION *(mo., day, & yr.)*	3. PERFORMED BY: *(EPA/State)*	4. DESCRIPTION

X. REMEDIAL ACTIVITY *(past or on-going)*

☐ A. NONE ☒ B. YES *(complete items 1, 2, 3, & 4 below)*

1. TYPE OF ACTIVITY	2. DATE OF PAST ACTION *(mo., day, & yr.)*	3. PERFORMED BY: *(EPA/State)*	4. DESCRIPTION
Construction	1971		New surface lagoons & sewer system

NOTE: Based on the information in Sections III through X, fill out the Preliminary Assessment *(Section II)* information on the first page of this form.

MASTER FILE

Date: 10/23/80

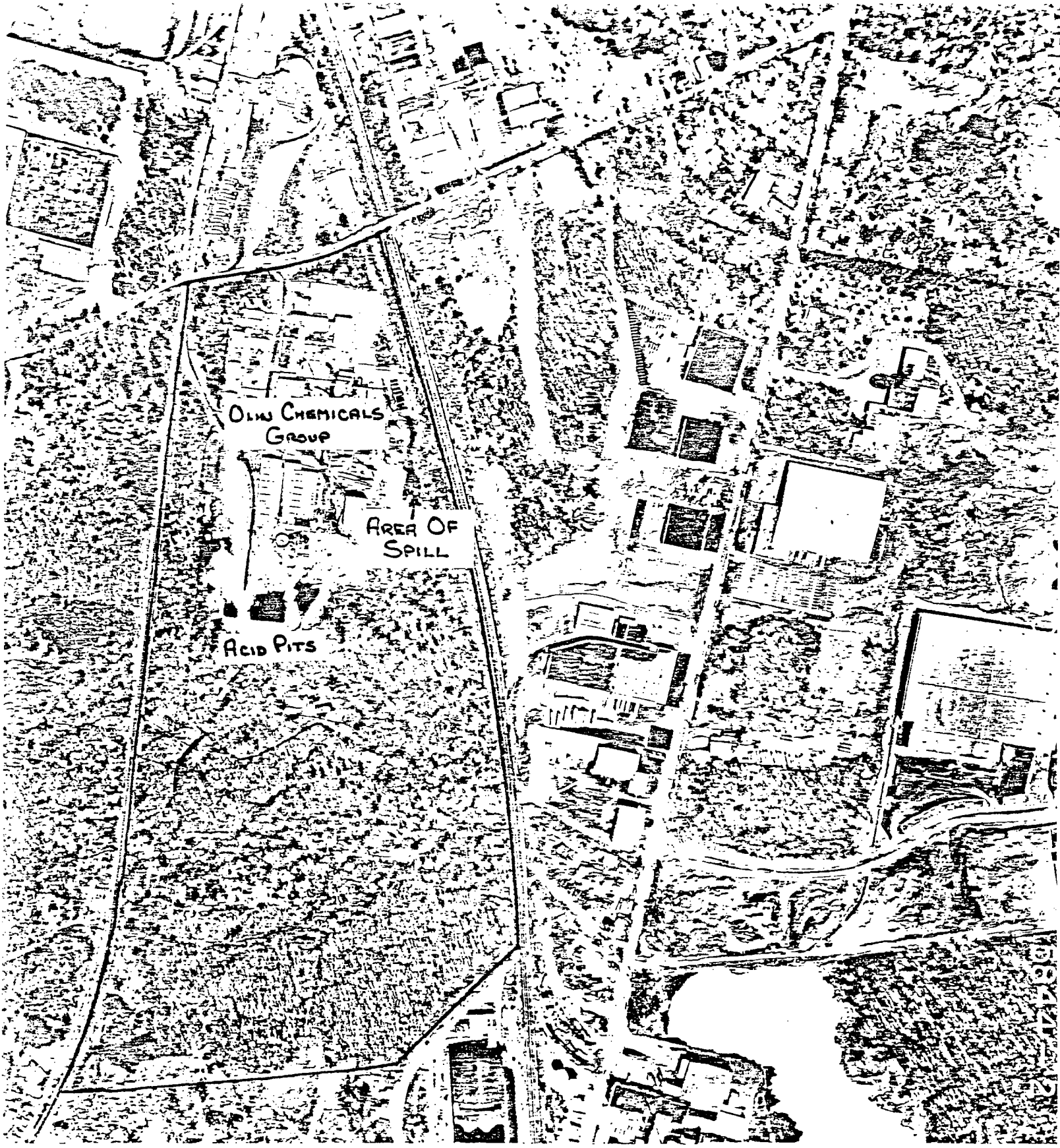
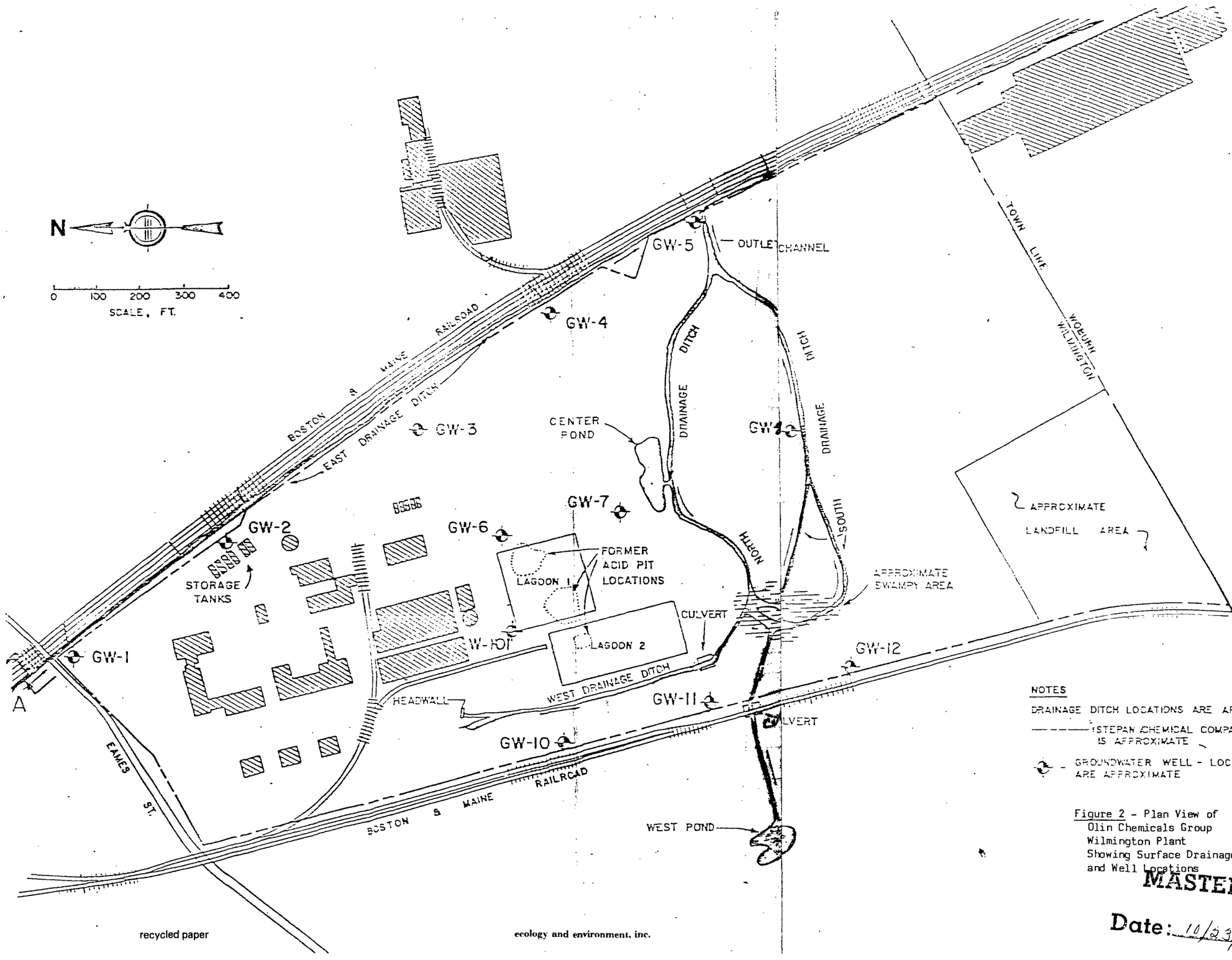


Figure 3 - April 24, 1971
Aerial Photograph Showing the Location of the Former Acid Pits.

MASTER FILE

Date: 10/23/80



NOTES

DRAINAGE DITCH LOCATIONS ARE APPROXIMATE

——— STEPAN CHEMICAL COMPANY PROPERTY LINE IS APPROXIMATE

GW - GROUNDWATER WELL - LOCATIONS ARE APPROXIMATE

Figure 2 - Plan View of
Olin Chemicals Group
Wilmington Plant
Showing Surface Drainage
and Well Locations

MASTER FILE

Date: 10/23/80

Figure 4 - 1977
Oblique Aerial Photograph
Olin property in Wilmington